

Aide-de-Camp's Library



Rashtrapati Bhavan
New Delhi

Accn. No. 594

Call No. IX (c) - B

By
Air



Photo by courtesy]

[London News Agency

THE PRINCE OF WALES PUTS ON HIS FLYING KIT

BY AIR

by

Sir Harry Brittain

K.B.E., C.M.G., LL.D.

With an introduction by
THE MOST HON.
THE MARQUESS OF
LONDONDERRY, K.G.
SECRETARY OF STATE FOR AIR
& WITH 88 ILLUSTRATIONS

X

PRINTED IN
GREAT BRITAIN,

This Book on Empire Aviation
is dedicated by kind permission
to

HIS ROYAL HIGHNESS THE PRINCE OF WALES

who by his own example
has done so much
to make our nation air-minded

Preface

AFTER enjoying so many hours of air travel in various parts of the world it was natural that my mind should turn to a book describing the wonderful progress made by Britain in the realm of civil aviation.

This book really originated at a little dinner-party in the Royal Air Force Club, at which were present my friend Mr. G. E. Woods Humphery of Imperial Airways, some well-known pilots and officials, and the novelist-traveller, Mr. William J. Makin. In the talk that followed it was pointed out that the intense development and real achievements of civil aviation in Britain had never been completely recorded, and that an endeavour to do this should be made before the material available had been lost.

With that rashness usually left behind with youth, I decided to make some attempt in this direction, and to bring my experience up to date set off on a 16,000 miles flight to the Cape and back with my good friend Makin as a most congenial companion. Without his help the book might never have appeared, for the task soon assumed unexpected proportions. Apart from the observations and photographs taken on this particular flight, and reminiscences of the past, there were innumerable talks with officials, pilots, and experts, as well as a small library of books and documents to study, and throughout each and all of these labours I am more than grateful for his ever-ready and untiring assistance.

In connection with the chapter on the Royal Air Force, which I soon discovered to be an integral part in the development of civil aviation, I should like to acknowledge the help given me by Sir Christopher Bullock, Permanent Secretary of the Air Ministry and Member of the Air Council. He was also kind

The help of Imperial Airways was readily and generously given, and indeed the part played by them in the development of civil aviation is deserving of all praise. I am indebted to them for placing one of their powerful new monoplanes at my disposal, and giving me every assistance in the study of the African route along which we flew.

I have consulted many books on the air, and I should like to take this opportunity of offering my sincere thanks to the authors of the following : *The Third Route*, by Sir Philip Sassoon (Heinemann) ; *Down Africa's Skyways*, by Benjamin Bennett (Hutchinson) ; *Indian Air*, by Paul Morand (Cassell).

To my friend the High Commissioner of Canada, as well as to the Prime Minister, I am deeply indebted for the great trouble taken in obtaining for me information required from the Dominion, and also to Sir Thomas Wilford for his notes on aviation in New Zealand.

The chapters on "International Barriers" would have been impossible without the valuable co-operation of the London Chamber of Commerce, as well as that of Lieutenant-Colonel H. Burchall, D.S.O., of Imperial Airways, a great authority on the intricacies of international air problems.

Through the kindness of Squadron-Leader Goddard I obtained the details I required of the development of the air squadrons of Oxford and Cambridge.

The chapter which includes a description of the flights of H.R.H. the Prince of Wales and the manner in which he has helped towards the air-mindedness of people in Britain is based on the helpful assistance given me by his pilot, Flight-Lieutenant Fielden, as well as by my friend Sir Godfrey Thomas, the Prince of Wales' private secretary.

The book contains many photographs, in addition to those taken by myself, for permission to make use of which I am very grateful to the various friends concerned.

Finally, I have to thank Major K. M. Beaumont, D.S.O., Captain J. L. Pritchard of the Royal Aeronautical Society, and Mr. D. H. Handover of Imperial Airways, who very kindly read the manuscript and made several valuable suggestions.

Contents

PREFACE

INTRODUCTION BY THE MOST HON. THE MARQUESS OF LONDONDERRY	xiii
--	------

Chapter I

INTO THE SKY	15
--------------	----

Chapter II

AT CROYDON	35
------------	----

Chapter III

IMPERIAL AIRWAYS BEGINS	59
-------------------------	----

Chapter IV

THE ATLANTIC ROUTE	79
--------------------	----

Chapter V

TO INDIA AND AUSTRALIA	111
------------------------	-----

Chapter VI

THE AFRICAN ROUTE	132
-------------------	-----

Chapter VII

ADVENTURE IN THE SKY	165
----------------------	-----

Chapter VIII

THE R.A.F	215
-----------	-----

Chapter IX

BIRD'S-EYE VIEW	237
-----------------	-----

Chapter X

YOUTH AND AVIATION	256
--------------------	-----

Chapter XI

INTERNATIONAL BARRIERS	274
------------------------	-----

INDEX	289
-------	-----

Illustrations

H.R.H. The Prince of Wales puts on his flying-kit *Frontispiece*

	FACING PAGE
At the Camp D'Auvour, Le Mans. Wilbur Wright and his biplane - - - - -	18
Wilbur Wright in flight - - - - -	18
Just before her last flight—R 101 at the mooring mast -	19
Wandsworth, 1906. "Vivienne" ready to start - - -	26
Descent in Essex - - - - -	26
"Atalanta" at Kimberley - - - - -	27
Brighton, 1912. <i>Daily Mail's</i> "Wake up, England" tour	27
Bringing back the Schneider Trophy to England, 1927.	
Race at the Lido, Italy - - - - -	30
The Winner (Super Marine Napier—S5) at Calshot -	30
Vickers' "Victoria" troop-carrier engaged in flying blind	31
1909—Avro triplane (9-h.p. engine) - - - - -	31
Croydon by night, showing the "Neon" beacon. - -	38
Croydon aerodrome by day - - - - -	38
Position of 'plane being determined from bearings given by the pilot to the controller at Croydon - -	39
Look-out man on control tower - - - - -	39
Some well-known pilots - - - - -	50
More well-known pilots - - - - -	51
Sir George Beharrell welcomes home Sir Eric Geddes from South Africa - - - - -	62
Taking aboard the Christmas air mail - - - - -	63
London-Paris route, 1919 - - - - -	70
'Plane of the "Hannibal" on the Indian route - -	70
Sir Eric Geddes arrives at Capetown on tour of inspection	71

	FACING	PAGE
Ottawa in winter - - - - -	-	86
Niagara Falls - - - - -	-	87
R 100 in Canada ; signatures of crew and landing officers		102
Super Marine Southampton (Napier) over the Needles, I.O.W. - - - - -	-	103
Lepanto, Greece, from 3500 feet - - - - -	-	114
North of Corfu - - - - -	-	115
The ex-Kaiser's palace, Corfu - - - - -	-	115
Karachi. Native ground staff overhauling the engine -		118
Galilee - - - - -	-	118
On the way to Baghdad. Rutbah Wells - - - - -	-	119
Tarim, in Arabia - - - - -	-	122
Over the Arabian coast. Mukalla, looking east - - -	-	123
Author leaving Echuca, New South Wales - - - - -	-	126
Flying in Australia, over the mountains of Victoria -		127
Flying boat over the Pyramids - - - - -	-	134
Palestine, the wilderness round Judea - - - - -	-	135
An aerial view of the Suez Canal - - - - -	-	135
Dodoma aerodrome - - - - -	-	138
Capt. Alcock with Lady Bandon and Mrs. Cumming at Wady Halfa - - - - -	-	138
Shipping at Kisumu - - - - -	-	139
The submerged temple of Philæ - - - - -	-	139
The temple of Abou Simbel - - - - -	-	142
An orange estate, Northern Transvaal - - - - -	-	143
The Rand under a rainstorm - - - - -	-	143
Fairey Napier long-range monoplane - - - - -	-	146
Salisbury Cathedral, Southern Rhodesia - - - - -	-	147
Clouds over the Matoppos - - - - -	-	147
The "Big Hole" at Kimberley - - - - -	-	150
Gordon Store and the Author at Wynberg, South Africa		151
The last barrier to the Cape over the Hex River mountains		158
Top of Table Mountain, Capetown - - - - -	-	159
Buffalo on the move in Western Canada - - - - -	-	182

ILLUSTRATIONS

xi

	FACING	PAGE
Air-Commodore Sir Charles Kingsford-Smith	-	- 183
Flight of Aircraft No. 2 Indian Wing, from Risalpur to Gulgit, 1932	- - - - -	198
Rakaposhi Mountain (25,550 feet)	- - - - -	198
The conquest of Everest	- - - - -	199
Hawker Super Fury	- - - - -	218
No. 1 Squadron (Furies) make their own numeral in formation	- - - - -	219
Air warfare by loud speaker. Cowing rebels by verbal "bombs"	- - - - -	222
Super Marine Southampton (Napier) Flying Boats on the River Tigris, 1927-8	- - - - -	223
Fairy III F in flight over Aden	- - - - -	230
Fairy III F aircraft returning to Aden	- - - - -	231
London, from 23,000 feet	- - - - -	242
Another view of London, from 23,000 feet	- - - - -	243
Stonehenge. Aerial photography discovers a lost avenue	- - - - -	251
Windsor Castle	- - - - -	252
The cover of H.R.H. the Prince of Wales's log book	- - - - -	258
A page from H.R.H. the Prince of Wales's log book	- - - - -	259
H.R.H. the Prince of Wales descends from his 'plane	- - - - -	262
The Prime Minister climbs aboard	- - - - -	262
The R.A.F. Reserve Flying Club opening meeting	- - - - -	263
Changing a wheel at Tobruk	- - - - -	266
Final adjustments to the Prince's 'plane	- - - - -	266
Brooklands Aero Club. Girl pilots pushing their machine into the hangar	- - - - -	267
Brooklands Aero Club. Discussing the morning's flying	- - - - -	267
The first meeting of the R.A.F. Reserve Flying Club at Hatfield	- - - - -	270
Oxford Air Squadron over Canterbury	- - - - -	271
The Author's welcome at Malta	- - - - -	278
Toward the sunset—flying over the Medway	- - - - -	279

Introduction

by

THE MOST HON. THE MARQUESS OF
LONDONDERRY, K.G.
SECRETARY OF STATE FOR AIR

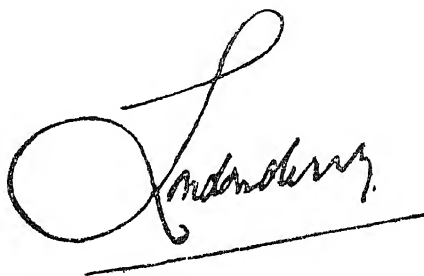
My friend Sir Harry Brittain has added to the long list of his services to the cause of flying by producing a popular and eminently readable account, which it requires no technical or inner knowledge to understand and enjoy, of the work that is being done to develop British air transport for the benefit of the Empire. It is certainly a happy augury that the verdict of such an experienced traveller should be so entirely favourable.

Aviation is passing into the hands of its second generation, the pupils of the pioneers of flying, who may themselves justly claim in their turn to be the pioneers of regular commercial flying. Sir Harry Brittain's varied and intimate association with aviation covers the whole period from his first adventurous balloon ascent in 1906 to his able Chairmanship of the Session on Air Transport at the Congress of the International Chamber of Commerce held this summer in Vienna—nor, I am glad to say, does this active interest show any sign of coming to an end.

When we think of the great advances that have already been made and cast our minds forward to the achievements which will undoubtedly be added to them by succeeding generations, we owe a debt of gratitude to all those who are at pains to preserve something of the atmosphere of these early

days, and of the practical, resourceful, and friendly spirit that is characteristic of the whole community of flying men and women throughout the world. This spirit is clearly depicted in Sir Harry Brittain's pages, and my own experience confirms it. It is a spirit of comradeship that attracts and holds the ever-widening circle of those who use the air in pursuit of their business or pleasure, and offers, in my opinion, one of the most valuable prospects of international understanding and peace.

Much of this book has deservedly been devoted to the work of Imperial Airways, a great organization of which the Empire may rightly be proud. This and many other examples which the reader will discover for himself are a proof that these early chapters in the story of British Aviation, memorable as they will always be for individual acts of heroism, contain the no less honourable record of foundations securely laid by patient enterprise and sound craftsmanship, those qualities upon which the Empire depended for the mastery of the sea and on which it still relies for its future destiny in the air.

A large, stylized handwritten signature, likely 'Lord Rothermere', written in dark ink. The signature is fluid and cursive, with a large initial 'L' and 'R'. It is positioned above a single horizontal line.

Air Ministry,
Gwydyr House,
Whitehall, S.W.1.
1st November, 1933.

By Air

CHAPTER I

INTO THE SKY

I

MEN and women are lifting up their eyes to the sky. That is the significant fact of our generation. Few people seem to realize that once a man looks up instead of down, his imagination increases tenfold. Previously, we were hemmed in by streets, by brick buildings, by the noisy ant-heap that we call the earth. We were busy with earthy problems, and our minds, like our feet, were set firmly on the earth.

Now, the universe is above our heads. We gaze upon it with that half-frightened curiosity which has led man to so many great victories and achievements. Into this unexplored region where the sun lights up unfathomable depths of blue, where the stars glitter at night or that cold, dead planet, the moon, reveals its extinct volcanoes, its mountains and ravines, man, seated behind a roaring, pulsating engine, is exploring.

The sky is the realm of great adventure. It is the emptiness that beckons the explorer of to-day. Picard shoots up in a steel spheroid into that strange area of the stratosphere, penetrating higher than man has ever reached before, and he returns alive with the readings of his scientific instruments to tell us of conditions that exist ten miles high.

But even Picard is only one of a long line of adventurers. Men of every country are exploring this new realm. The sky to-day has become almost as matter-of-fact as the sea, and a highway of transport that is sufficiently regular to make it almost mundane. As I write, there lies on my desk a small timetable which, twenty years ago, would have seemed an incredibly

romantic concoction by Jules Verne. This time-table is the air A.B.C., and is to-day almost as necessary to the business-man as is the railway time-table.

I flick the pages of this modern time-table of the skies. It tells me that I can leave the Imperial Airways terminus at Victoria, London, early in the morning, and before eleven o'clock I shall be at the air-port of Paris, Le Bourget. I can take an apéritif and a biscuit in France, and be again on my way skywards, reaching Bâle, in Switzerland, just in time for lunch. If I wish to proceed further after lunch, I can again travel by Imperial Airways machine and be at Zurich before tea-time.

The ordinary man of to-day may consider that ordinary. I consider it a wonderful achievement. The whole of the beauties of Switzerland are spread before me, and none of them more than twelve hours from London. Grindelwald, Interlaken, Lugano, Lausanne, even St. Moritz—the skyway route of Imperial Airways will take me there in record time, with the minimum of discomfort and, what is even more worthy of emphasis, safer than by any other means.

Turn the pages of the air A.B.C., and consider the sky adventures that are spread before you. In four and a half hours an Imperial Airways machine will transport me from London to Cologne, and with the help of Swiss and Austrian air-lines I can be in Budapest in thirty and a half hours. Berlin is a mere seven hours from London. I have flown along this route. I have breakfasted in London, lunched at Amsterdam, and been in my hotel in the heart of Berlin in time for afternoon tea. The aeroplane is the modern flying-carpet of romance.

The superiority of air over land transport can be discovered from the air A.B.C. From London to Vienna can be flown comfortably in a day. Venice can be reached from Berlin in less than six hours by air, and a flight from Berlin to Moscow takes no longer than twenty-two hours. Even Oslo, in the far north, can be reached from London in about twenty-two hours. The whole of Europe is now covered with air routes like a gigantic spider's web in the sky. Behind those droning engines one may move swiftly from London to Constantinople, from Berlin to Rome.

But my air A.B.C. does not limit itself to the skyways of Europe. The whole world begins to spread before the eyes as the

routes of Imperial Airways are detailed. Flying-boats of Imperial Airways surge across the Mediterranean. From Athens I may climb the sky to Alexandria and Cairo. I can wander through the bazaar of the Mouski in Cairo and then proceed to the temples of Luxor. I may be tempted to fly southwards, to the Sudan, thence to Kenya, and finally to the Cape itself.

Or my thoughts may turn eastwards. There is Palestine. I may wing over Jerusalem, drone across the desert to Bagdad, and then go along the route that leads to India, and will eventually span the globe, reaching Australia. And all the time I shall be flying British. I shall be seated in one of those marvellous steel monsters which comprise the great air fleet of Imperial Airways. These aeroplanes are making sky history. They are winging where men fear to tread.

It is of these achievements, this wonderful work performed by Imperial Airways, that I wish to tell in the pages of this book. There is so much to tell that has never been told. As a nation we are somewhat backward in talking about our achievements. Napoleon once described us as a nation of shopkeepers. At the same time, I suspect that many of my good American friends look upon us as the world's worst salesmen. We frequently fail to sell our goods, and yet we have some of the finest goods in the world. So far as aviation is concerned, no apology is needed to try and place its achievements on record.

It is this story—Britain in the skies—that I wish to unfold.

II

When man first essayed into that unknown region of the sky, it was by means of the balloon. It is significant that the record height achieved by man—that of Professor Picard—was also by means of the balloon. Ballooning, in fact, attracted the real pioneers of aviation.

My own first journey by air was made before I ever saw a heavier-than-air machine, in fact there were very few of the latter to be seen. It was in March 1906, when my very good friend, the late Charles S. Rolls, one of our flying pioneers, and one whose memory will ever be preserved by the great concern

which bears his name, persuaded me to take a flight in the Aero Club's balloon *Vivienne*.

My wife and I made our way to the Wandsworth gasworks in company with another old friend and great pioneer, Colonel Moore-Brabazon. There we met Frank Butler, Charlie Rolls, and some of those wondrous energetic members who built up the Aero Club in its early days. There was a hard westerly breeze, and a little committee of experts got together to decide from what part of the ground we should ascend. There were several problems to be considered. In addition to the surrounding buildings there was a large and ominous-looking chimney which doubtless shot out very hot air as well as smoke. Just as we started the wind, of course, shifted a bit, and we as near as nothing collided with the chimney.

Looking back at an old press-cutting book I find in one of the London papers on March 6 a picture of the balloon with, underneath, the wording "Colliding with the chimney", and it certainly looks for all the world as if there had been a pretty violent collision. But Charlie Rolls, who never lost his head, was overboard enough and sent us hurtling up at what seemed to be a terrific pace and the chimney was just missed. It was an uncanny moment, a sort of confused evaporation from the earth. However, that was soon over, and then followed a feeling of the most intense noiselessness and peace.

We were about eight hundred feet up, and rising, driven along in a light westerly breeze. I shall never forget my astonishment at first seeing London from the air. I had seen it before from the top of St. Paul's Cathedral, but by the time we reached St. Paul's we had got up several thousand feet, and, although there was a haze surrounding the great city, there seemed to be beneath us an absolutely endless London which many of us have got to know so well since from this angle of the air, and which, although it can never become commonplace, is no longer a matter for excitement. But that first view, drifting in absolute quietude beneath that vast gas-bag, will never be driven from my mind.

What an extraordinary view it was! Right underneath was Clapham Junction, looking exactly like a child's toy railway, with little squat engines giving out plump little puffs of smoke. Just ahead was Battersea Park, a tiny oasis of green, the boats in

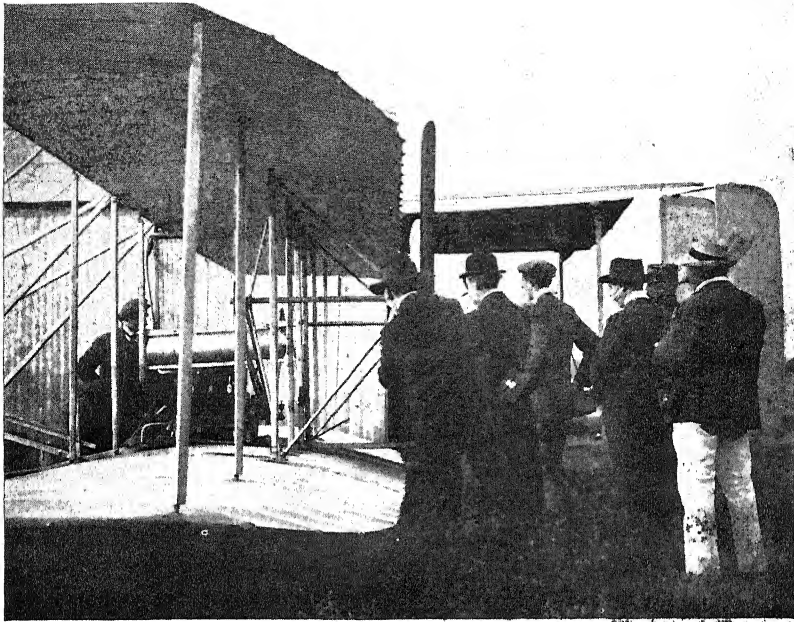


Photo by]

Author

AT THE CAMP D'AUVOUR, LE MANS.
WILBUR WRIGHT (LEFT) AND HIS BIPLANE.

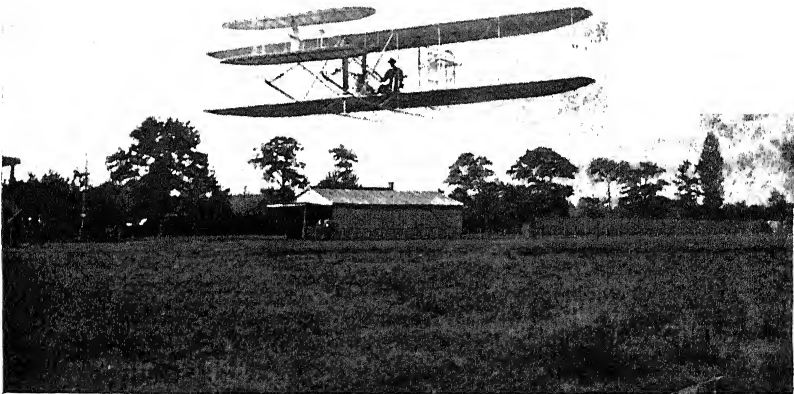


Photo by courtesy]

[Royal Aeronautical Society

WILBUR WRIGHT IN FLIGHT

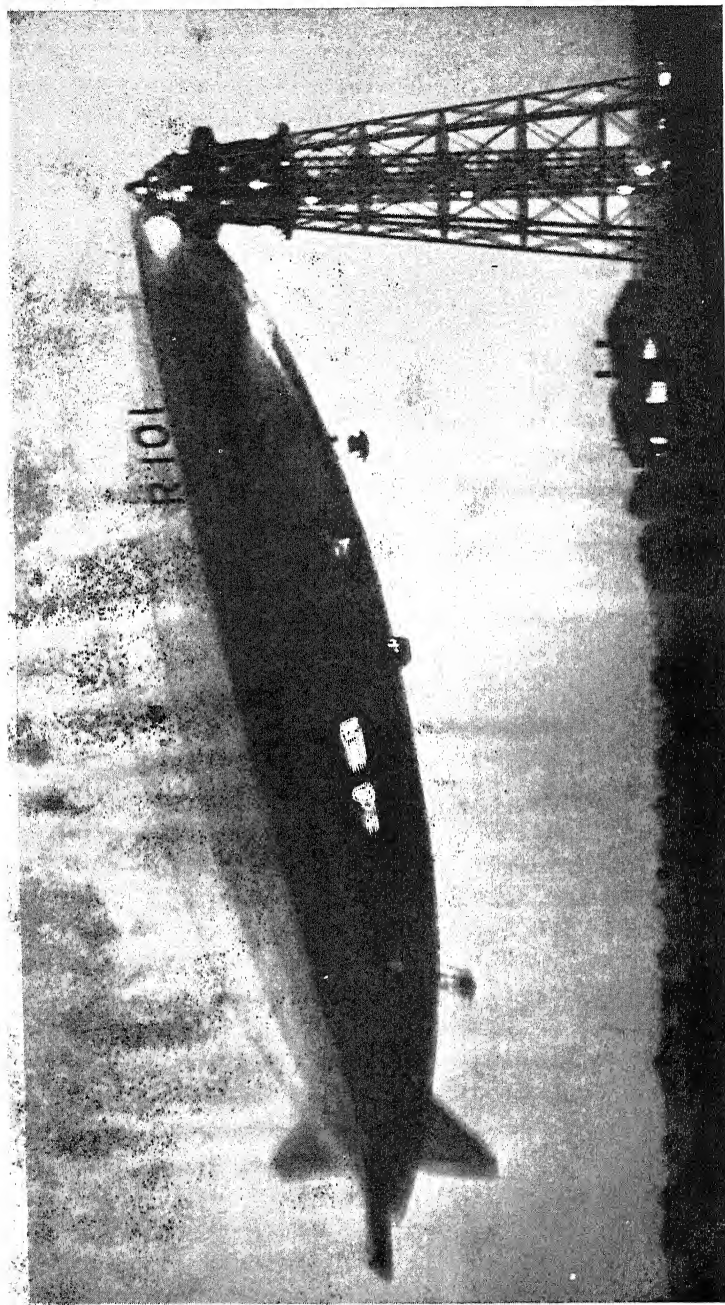


Photo by courtesy]

JUST BEFORE HER LAST FLIGHT—R 101 AT THE MOORING MAST

[*"Flight"*]

the pond with their moving oars resembling water-spiders, as they wandered about in all directions. In front of us were houses, always houses, until they were lost in the haze. And right through the midst of everything, curling like a great long eel, was the Thames.

Still moving in an easterly direction, we passed over Big Ben, some three thousand feet below, and after that, following the river pretty closely, discovered the Tower Bridge beneath us. We seemed to be now on the top of London smoke, which stretched out under the dark blue sky in all directions like a great grey tableland, while half-way down between ourselves and the earth we could see in the mist a black, cone-shaped form—our own shadow. Over the great docks we passed and saw a long array of huge ocean liners and every kind of craft. Slowly descending, we left Woolwich and West Ham behind for the Plumstead Marshes, dotted on all sides with powder magazines, each surrounded by its little moat.

The trail-rope was out now, dangling in a long thin line some quarter way to the ground. Again we crossed the river, this time above Erith, and, sailing pretty low, made our way over an outgoing steamer, which saluted us with her siren. Open country at last, and with it a bright, clear atmosphere as we glided across the Essex marshes. We learnt from the interested spectators that there was a railway station about two-thirds of a mile ahead, and we decided to come down in a large field on the near side. The grapnel was held in readiness, the valve opened, and down we came with a steady sweep. Over went the grapnel, and our skipper ordered us to hang on to the ropes above and so avoid the bump when we met Mother Earth. Down we came, just a slight bump, but the grapnel refused to hold, and we described another short parabola.

This time the grapnel went right home in the side of a deep ditch. We met the earth again, and, after one or two attempts to remain stationary, succeeded in doing so. Then we scrambled out, surrounded by critical onlookers, who came up in endless array from everywhere. The rest was simple. Willing hands under skilful guidance reduced the once proud *Vivienne*. In what seemed to me a meagre space of time she was deflated, disconnected and neatly packed in her own basket, all ready for the cart which took her to the station.

Before Professor Picard and Soviet experimenters achieved record heights in the stratosphere, the greatest altitude had been attained by the German balloonists, Suring and Berson. They reached 35,200 feet. Of course, I am still discussing ballooning only. Captain Cyril Uwins, principal test pilot of the Bristol Aeroplane Company, recently ascended in an aeroplane to nearly 45,000 feet.

Seventy years ago two British balloonists, Glaisher and Coxwell, claimed to have reached a height of 37,000 feet, but both lost consciousness while the balloon was still ascending. Lack of oxygen was the trouble. Unlike Professor Picard, they had not thought of enclosing themselves in a steel spheroid. When the two adventurous balloonists recovered consciousness, the balloon was falling.

But I would like to have been in Paris on the day when a man from Brazil walked into a garden with a gas-bag tied to a bicycle saddle. He threw his leg over the saddle, started up a three horse-power engine and yelled: "I think she'll clear the trees." And she did. The strange machine rose majestically in the air, carrying with it its equally strange rider. That man was Alberto Santos-Dumont, the son of a Brazilian coffee merchant, who was the first to astonish the world by his flights in little cigar-shaped dirigibles.

Santos-Dumont built at least fourteen dirigibles. He led the way for those mammoth airships—the Zeppelins that raided Britain, the military and naval airships used by Britain and the United States, the R 100 and the ill-fated R 101, the Graf Zeppelin and the airship that took Commander Byrd, the American, to the North Pole.

Airships are still a matter of great contention. Whether they will again be seen in active use in this country is doubtful. I prefer, however, to leave such a discussion to experts. I will content myself by pointing out that airships have contributed a great deal to our knowledge of the air. They are able to attain great heights, and because of their roominess it is possible to make scientific observations that are difficult to the lone aviator pointing the nose of his machine to the roof of the sky.

During the war, German airships raiding Britain ascended to great heights. Sometimes their altitudes exceeded 20,000

feet. The crews experienced freezing cold, but these heights were necessary at the time to avoid the anti-aircraft guns below and the British aeroplanes cruising just beneath.

My own first airship adventure was in a British dirigible, R 36, on June 17, 1921. It became the first fully equipped British aerial passenger liner under the name of "Civil Airship G-F. A.A.F." I was invited, together with some other members of Parliament, to voyage in this airship from Pulham airship station.

On its release from the mooring mast the R 36 rose to about 1200 or 1500 feet before many of the passengers were aware that she had moved at all, so swift and gentle was the rise. Then the engines started, and after a preliminary circuit of the station the airship turned eastward. The route taken was via Beccles to Lowestoft and a few miles out to sea, just far enough to render the coastline a margin of pale gold, and then, turning north, the coast was approached and skirted past Yarmouth (coming near enough to see the holiday-makers enjoying themselves on the famous sands) as far as Caister. Then the airship came back again along the coast to Yarmouth, and a direct run inland to Pulham. About a hundred miles were covered over the myriads of rectangular tinted fields that make up the county of Norfolk.

But I shall not easily forget the cruise I had some years later in the R 100, sister of the R 101, and at the time the greatest airship in the world. Through the courtesy of the Air Ministry I was enabled to take part in the twenty-two hour trial trip of this giant of the air.

It was in the afternoon of a brilliant day that we drove down to Cardington, near Bedford, where this monster was housed—where, in fact, she was born. Long before the end of our drive she loomed into sight, tethered to her mast, the whole 707 feet of her glistening like polished aluminium in the rays of the sun.

A few preliminaries and introductions below, an odd form or two to sign, to the effect that if one slipped into another world no one was responsible, and other simple agreements, and then for the foot of the towering mast. The luxury of a lift was a great contrast to those earlier days when we laboriously climbed up the winding staircase to R 36 at Pulham.

Once out of the lift and along a short passage, I was met by a steward who took my bag and said: "May I show you your room, sir?" Somehow, in the air, this sounded quite odd. It was a long walk to my room, first down an interminable gangway and then via the main saloon and a flight of stairs to the upper deck, where I was shown into a simple two-berth cabin with sleeping-bags on the bunks and gay-coloured curtains above.

I then met my fellow travellers, Booth, Scott and the officers, as well as my friend and colleague Montague, the Under-Secretary of State for Air. All aboard, and in no time we were off, but so quietly and so smoothly that there was no indication of it. All one felt during the next few minutes was a slight alteration of altitude. We circled round Bedford, gazed upon the ancient church of Bunyan, and noticed how wonderfully clear was the atmosphere as we looked across St. Albans, Welwyn and innumerable golf links. But for all-round observation the main saloon was not too good. In the first place all one had was a side view similar to that from a railway carriage, but with talc instead of glass windows. There was, however, the considerable advantage of height.

As we went along it was interesting to notice that cows, horses and sheep appeared to be frightened as the airship went over them. Why, I don't know, for the average 'plane leaves them perfectly unexcited. Almost immediately London appeared, the air clear as crystal, and as we floated over the city the outstanding marks were the spires of Wren's churches surrounding St. Paul's like a bodyguard.

Up the river to Westminster, the Houses of Parliament looming large, my own little house in Cowley Street looming small, but none the less still on the map. In Battersea Park all games of tennis stopped as we sped overhead, and once again we circled round to Westminster by Belgravia and Buckingham Palace. Then in quick succession followed Trafalgar Square, Piccadilly and Portland Place, up to the heights of Hampstead.

As we swung eastwards towards Essex the London we had left seemed almost like a fairy city under the golden rays of the setting sun. And then my friend, Commander Burney, came to tell me that dinner was ready. Well, it was getting late, and I was ready too. We duly sat down at little tables of four, Burney

and I being joined by Skipper Booth and Montague. Chops, chips and beer were the main items of our meal, with a piece of cheddar cheese to follow. And very good it all was.

Tilbury passed us as it was growing dusk, and then gleamed below the lights of Southend. We were at the mouth of the river, which we left to make our way towards the north, passing over what appeared to be an endless succession of inlets and waterways.

A long chat on civil air policy, another look overboard, then to bed about ten. The top berth I chose because the light was just over it. I curled up in the sleeping-bag with one blanket underneath and two on top, for the temperature was pretty low and the heating apparatus was not in operation.

The first experience in that bunk was unusual. There was a faint hum of the engines, unlike the sound of a 'plane; and, again, the sensation was quite different from that of the throb of a ship. However, I slept until nearly seven and then discovered that, though it was a fine morning, there was nothing to look at but sea. Sea "neat" soon becomes tiring, so back to bed again and slept till nine. A good night.

By this time even the sea had disappeared and there was nothing to look at but clouds, which were not only uninteresting but exuded chilliness. I filled in the time by making a tour of the ship. I must have walked for about a hundred yards along a perilously thin gangway surrounded by an intricate network of wires, ballast bags and petrol tanks, with here and there large apertures covered with net, through which the air came in. Then followed a slight climb uphill as I approached the nose end.

It was rather an eerie feeling wandering there alone, for, although we were going ahead at about sixty miles per hour or more, there was no noise, no roar, nothing but really aggressive quietude. The engines, of course, were far away, and stream-lining did the rest. At the completion of my trip I was entirely ready for the excellent breakfast our hosts had provided.

At last through the clouds appeared patches of coastline, which proved to be the southerly point of my native Yorkshire and the mouth of the Humber. As we made our way from Hull to Leeds the clouds rolled away and were followed by as goodly a day as one could wish to see.

From now on most of my time was spent in the control-room,

from which one got an amazing view of the country. This room, suspended clear of the ship, was built of glass right down to the floor, and as it had an inward slope forward, one gazed upon the view directly below as well as that on every side. I was surrounded by gadgets of every kind and those most important items the rudder and elevator control, whilst behind us was the wireless-room. In our little house of glass there was also no noise of engines, all we heard being a pleasant swish of the wind as England slipped underneath.

The great airship caused considerable excitement as we passed over the big centres of population. There was one continuous stream from the houses to the streets and crowds of upturned faces. From Leeds we tilted up somewhat to cross the Pennines, and over a stretch of fine wold country reached Manchester, which, untrue to its reputation (perhaps ill-deserved), was bathed in sunshine. In this district it was recreation time in the school-yards, or so it appeared, and all the children waved energetically to us. Along the Ship Canal to the coast and, recognized from the air, Knowsley and a model village.

We flew into gorgeously clear weather and a great welcome as we swung over Liverpool. Every ship in harbour turned on its siren and a hectic chorus of sound ascended as down we dropped and circled once or twice right round Liverpool and New Brighton. Then followed a fairly straight run home over country traversed by the old North-Western—big grass fields and quiet villages.

At length we sighted the mooring-mast at Cardington. Our first attempt to hook up failed, but a circle round and a second attack was successful. In a few minutes we were drawn up, with the gangway down, and the delightful experience of our twenty-two hours' trial trip duly over.

In glancing through the notes I wrote at the time I came across this addition :

"Will these great ships be the big air-carriers of to-morrow, or will it be left to the giant air and sea planes, or will both forms be developed to a thoroughly reliable pitch? Our trip was made in almost perfect weather; a sudden south-westerly blow would have tested her more severely, so also would tropical rain. However, one knows that these gas-bags have

successfully passed the most trying climatic experiences, and improvements making for simplicity are ever being evolved. What one fears most is the ever-present risk of explosion from the gas-bags. A wider distribution of helium would make for much confidence."

III

I am not going to attempt to unearth the name of the first man to fly. It is one of those great and inevitable mysteries over which men will be disputing centuries hence. There are those who will attribute the first idea of heavier-than-air machines to Leonardo da Vinci, apparently the father of all things. Anything new is always sure of a real discoverer in the period of the Renaissance.

Only the other day the Brazilian Government announced that it was going to erect a monument to Bartholomew de Cusmao, a priest aviator of the eighteenth century who was the first man ever to fly. Hot upon this announcement came the discovery of a painting in the library of a castle at Schussenried, in Wurtemberg, which depicted a certain Father Caspar Mohr, who made several sundry successful flying experiments as far back as 1610.

"Once", observes an old document that tells of the adventures of Father Caspar Mohr, "he devised wings for himself made of goose feathers and made divers experiments therewith in flying until he was able to rise from the ground above the height of a man. He was likewise ready and willing to attempt a flight from the upper dormitories, three floors above the ground, into the garden, but this was forbidden him under holy obedience."

It seems somewhat strange that holy men should be the first to experiment with flying. There may have been something in their eagerness to reach heaven. But just to add confusion to this search for the man who first invented flying, I might point out that we can claim something for this country. There is an old legend of a flight by Bladud, a mythological King who was father of Lear. Bladud, who is supposed to have died somewhere about 852 B.C., is said to have made himself a pair

of feather wings with which he attempted to glide, but, losing control, came to earth on the temple of Apollon in the city of Trinovantum (London).

Then there was Oliver of Malmesbury, who, in the year 1020, fitted wings to his hands and feet and, jumping from a tower, maintained himself in the air sufficiently long to glide for a furlong. Then he fell to earth and broke his limbs. At a later date John Damian, a favourite of King James IV of Scotland, endeavoured to perform a similar feat. He jumped from the top of Stirling Castle, and ingenuously ascribed his failure to soar to the fact that his wings contained hen's feathers instead of being wholly composed of eagle's feathers. It might well be, however, that these brave Britons were the earliest pioneers of Imperial Airways to-day.

A man in London with an hour to spare might do worse than wander into the South Kensington Science Museum. There, in a practical, pictorial and model form one can study the whole development of aviation from its early beginnings. The very oldest as well as the latest craft are displayed. It is an entrancing collection which deserves more advertisement than it has had.

But the men who first dazzled the world with their power to fly successfully in power-driven machines were Wilbur and Orville Wright. These two brothers, who came from Dayton, Ohio, first became interested in aviation when they were joint proprietors of a small cycle shop. They devoured all the books on the science of flight that they could lay their hands on and then they went back to their shop, where they collected spare parts and built what to-day would be a Frankenstein monster in the air. The brothers carried out their experiments at Kitty Hawk, an isolated part of the coast of North Carolina, and here they made over a hundred gliding flights during 1900-1 and in a better machine in the next two years.

An incident worth recording of their first flight on December 17, 1903, was when the two brothers drew lots to decide who should take up the 'plane. Orville won, and Wilbur had to content himself with running at the side.

Their first great success was to remain in the air actually for twelve seconds. That was enough for the enthusiastic



Photo by]

WANDSWORTH, 1906. "VIVIENNE" READY TO START

[Author



Photo by]

DESCENT IN ESSEX

[Author

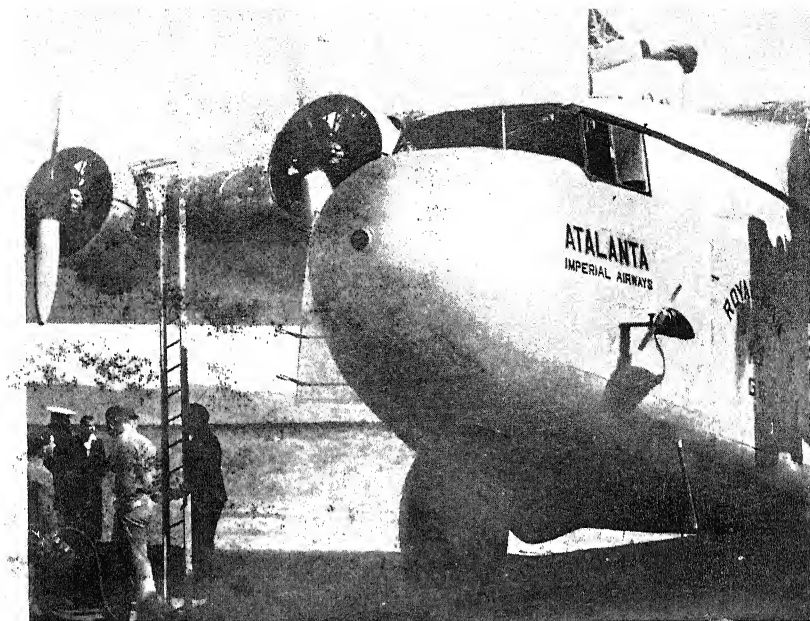


Photo by]

[Author

"ATALANTA" AT KIMBERLEY (ARMSTRONG SIDDELEY ENGINES)

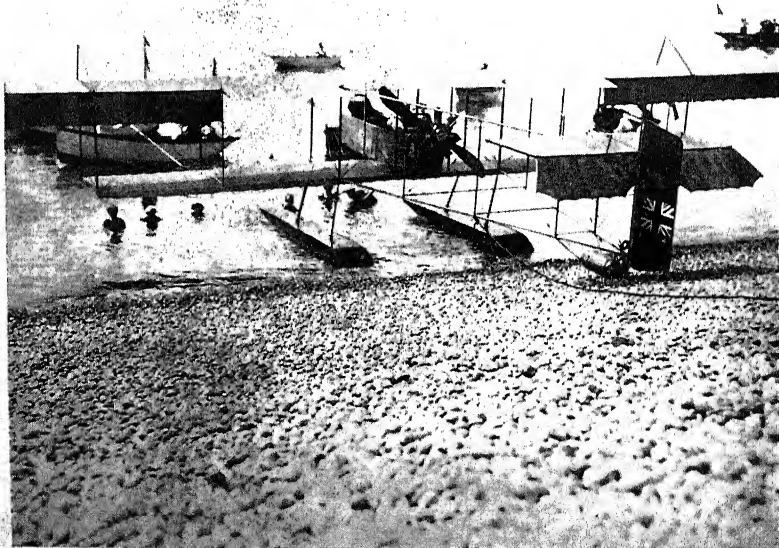


Photo by courtesy]

[Royal Aeronautical Society

BRIGHTON 1912
"DAILY MAIL'S" "WAKE UP ENGLAND" TOUR

Wright brothers. They persisted in their experiments, and in 1905 eclipsed all previous records by making a successful flight that lasted thirty minutes, during which time a distance of twenty-four and a half miles was covered.

In 1908 Wilbur Wright visited France to study the progress made by aviation in that country. It was during that visit that I spent a day with Wilbur Wright and gazed upon my first flying-machine.

This took place almost a quarter of a century ago, and, alas, I made no notes at the time. So there remain various vivid memories of Wright and his biplane, but blurred points of details as to many things I should like now to recall, especially with regard to the gist of our talk and the enthusiasm of those early pioneers who were gathered around him.

Those two excellent forms of recreation, ~~rigger~~ and fox-hunting, caused me to try a cure at Bagnolles de l'Orne to patch up a leg which had suffered slightly in their pursuit. During my stay, Wilbur Wright, who had accepted the invitation of the French Government to carry out his flights in France, arrived at the Camp d'Auvour at Le Mans. A mutual friend from the U.S.A. learnt that I was over in France and I was duly invited to the Camp d'Auvour. I accepted with considerable eagerness and awaited a telegram to inform me when all was ready and weather of the right brand for flying expected. One evening the eventful telegram arrived:

All in order, weather conditions steady, flying sure to-morrow.

Bagnolles was only sixty or seventy miles from le Mans, somewhat cross-country, and I had a car with me. I also had a long, lethargic chauffeur called Atkinson, a rare decent lad, but in the ordinary way less excitable than the most phlegmatic tortoise. That morning, however, Atkinson was all thrills, and when I came down about dawn he and the car had apparently been ready for hours.

At length we arrived. I met and shook hands with the great American pioneer, whom I took to at once. This "bird-man", as he was often called, was not unlike a bird himself, his strong face, full of character and determination, lit up by a pair of piercing eyes above a somewhat beak-like nose, counter-

balanced by a clear-cut jaw. Altogether he was the type of man who would see a job through to the finish.

I was received at the hangar, though I doubt whether the word had originated at that date, and after a little chat on the U.S.A. and mutual American friends we walked across the training-ground (aerodrome to-day) to a spot in the centre of which they had hauled the biplane. Looking back, I gazed upon what might seem to the eye of to-day to be a quaintly contrived contraption, an almost archaic museum piece, but to the eye of 1908, the eye of one who had faith, it was a stupendous achievement and a promise of much greater things to come. Thoroughly thrilled, I stared at the thing for quite a time, finding it difficult to realize that it could go up in the air—and stay there.

Wright's machine was, of course, made at Dayton, Ohio. It was a biplane with, in front, two small planes which served as elevator control, and two vertical planes behind for rudder. Its four-cylinder engine was of twenty-four horse-power and was connected by chains to two wooden propellers. It was not fashioned on wheels, as is the 'plane of to-day, but on skids like a sleigh, so that after each flight it had to be dragged back to an odd-looking device of spring-boards, with a super-catapult attachment. Then at the proper moment, with engine running, the 'plane all set, and Wright aboard, the lever was pulled, the catapult did its job, and up went the 'plane.

All this Wright explained to me while I stood beside him and did my best to grasp it all; then, with a smile, he added: "Would you like to come up with me?" As there seemed to be no kind of accommodation for a passenger and I was somewhat dubious as to the operation of the catapult, I assured him I should like nothing better, but that I should prefer to study the initial view from the spectator's angle. He agreed that this was sound.

When all seemed ready, Wilbur Wright put in at least another half-hour going over every detail again. I remember him as one of the most careful of men who gave meticulous attention to everything which concerned his 'plane, and rightly so, when one considers what he was evolving from the unknown.

At length he was satisfied. The 'plane was fixed on its runners, the catapult wound up, the engine running well,

the inventor aboard. Wright gave the signal, the lever was pulled, and half a dozen of us gazed with fascination as we watched for the first time a man take to the air in a heavier-than-air machine. As I saw him rise, and then swing round above the circuit of the Camp d'Auvour, my first impression was that of a man bicycling in the air. There was the same smooth motion on the straight and a similar kind of banking at the turns, but there it stopped.

This flight seemed to last for a very long time. I suppose it was really a matter of some four or five minutes. But the world's record was then only thirty minutes, and we had course, held by our friend Wilbur.

There was a very slight breeze blowing, and in due course we watched the "bird-man" approaching us and dropping slowly in the wind. Down, down he came until the skids were but a few feet above the ground, and when he landed he was within about fifty yards of us. (No bad landing, either, for a wheelless 'plane.) It was a great and thrilling moment.

That evening we dined, a little party of us, at the Dauphin Hotel at le Mans. Alas, most of these gallant fellows, sooner or later lost their lives in helping forward the science of aviation. The great inventor himself was claimed by typhoid, but not before he had the satisfaction of knowing that his work for the world had been established, and that his name would be added to the cherished list of immortals.

It was late when we started back to Bagnolles, and I drove slowly under the light of the moon, meditating on the happenings of a truly eventful day.

But flying was already being discussed with enthusiasm in England. Very soon actual flights were being made. And, as seems natural in this country, the pioneer aviators started by breaking the law. As recently as 1909 it was a punishable offence to fly, or, rather, to attempt to do so, except within certain hours. When in that year Mr. A. V. Roe, later Sir Alliott Roe, made his first flight he was followed ruthlessly by the police, who took his name and address. Before the case could come to court, however, the law was dramatically amended by M. Bleriot's flight across the Channel.

And this brings us to the same contentious subject with

which I opened. Who was the first Englishman to fly? In 1908 an American, S. F. Cody, was making flights in England, and soon A. V. Roe was doing likewise. In 1928 the Royal Aero Club tried to solve this problem. They appointed a committee to determine who was the first British subject to fly in a heavier-than-air machine in the British Isles.

After considering a variety of evidence, the committee decided that this distinction had been achieved by Lieutenant-Colonel J. T. C. Moore-Brabazon at Leysdown, near Eastchurch, in the Isle of Sheppey, between April 30 and May 2, 1909. On this occasion he flew for a distance of between a quarter and half a mile at a height of from fifty to eighty feet.

The flights of A. V. Roe made at Brooklands were considered, but the committee decided that these were in the nature of hops and not official flights. Nevertheless, it was those early exploits of A. V. Roe that helped to build up the great industry of British aviation.

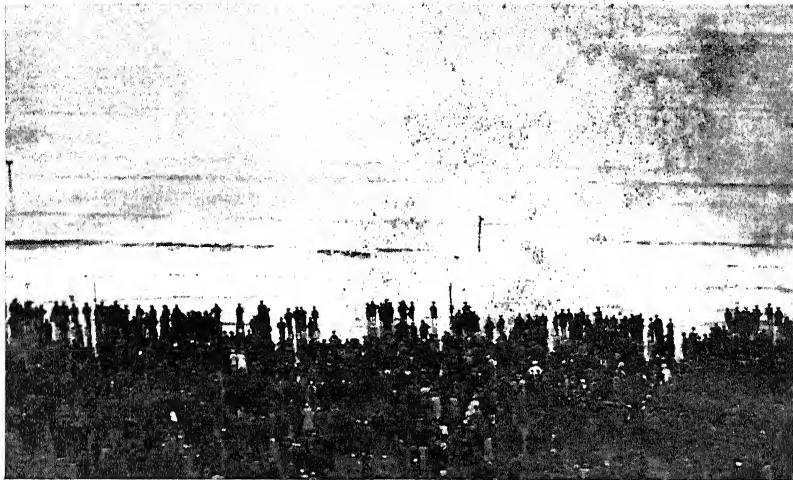
Among the other pioneers of those days in England were Handley Page, Sopwith, de Havilland, Short and Blackburn. All of them helped in the development of British aviation and each have their machines flying the skyways to-day.

IV

What ballooning was to enthusiasts in the early days of aviation, so is gliding to the young people of to-day. British gliding enthusiasts have done much to explore that region of the air of which we cannot know enough. The glider is the sail-plane, and the pilot must know his wind and air currents in a fashion that need not concern the aviator who sits behind a five-hundred horse-power engine.

Lately, gliding has suffered a slight eclipse. A summer or two ago it was possible to see the enthusiasts, including the Master of Sempill, group themselves on the top of Ivinghoe Beacon and be catapulted into the air on their gliders. Many of them carried the badge of Wasserkuppe, the great gliding centre in Germany where the experts went to train. There they met such world-famous gliders as Robert Kronfeld and Herr Groenhoff.

This gliding camp at Wasserkuppe has trained sail-planers



BRINGING BACK THE SCHNEIDER TROPHY TO ENGLAND—1927
RACE AT THE LIDO, ITALY



THE WINNER
(SUPER MARINE NAPIER—S5) AT CALSHOT

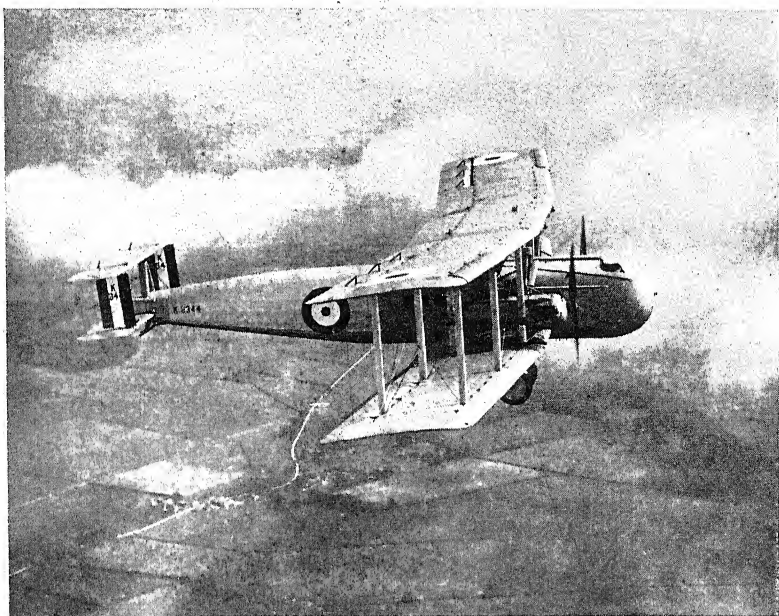


Photo by courtesy]

[Charles E. Brown

VICKERS' "VICTORIA" TROOP CARRIER (NAPIER ENGINES) ENGAGED IN
AN INSTRUCTIONAL FLIGHT OF FLYING "BLIND"

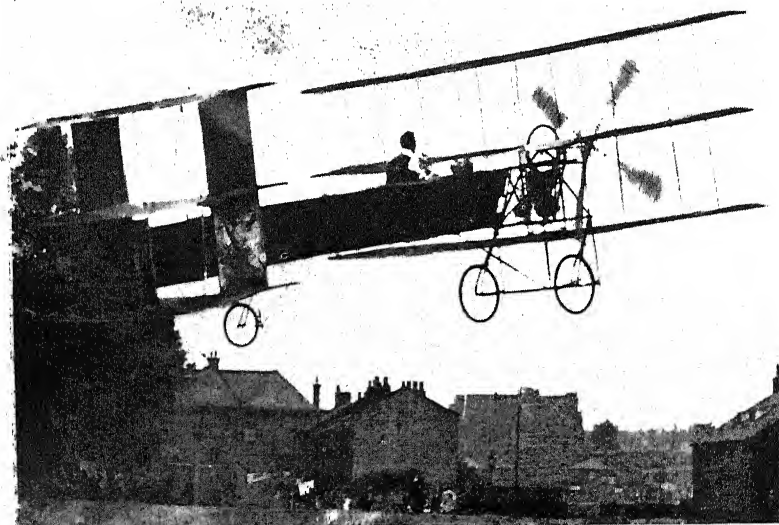


Photo by courtesy]

[Royal Aeronautical Society

1909—AVRO TRIPLANE (9-H.P. ENGINE), LEA MARSHES

from all over the world. American youths are particularly enthusiastic gliders, for they claim that there is nothing finer than riding a thunderstorm, soaring above an electrical tempest, and pitting the wits against the mysterious eddying currents of air that are as restless as the ocean.

All of which makes for air-mindedness. I would like to see a similar enthusiasm in England. Gliding seems a little out of favour at the moment. But it is a good school for the air-mindedness of the young, and I feel sure that many of our pilots of the future will be the better for it. Perhaps one day our glider schools may be as important for air training as are those training ships for the education of our future sailors.

v

They will tell you that the air has been mapped. Weathermen insist that they know more about the air than they do of oceans. Already we are penetrating the stratosphere. French and German inventors are building aeroplanes to fly in that strange region.

Are there, then, any mysteries left in the sky? The aviators who soar with their high-powered machines above the clouds sit there men like gods, talking by wireless telephone to earth. They tell what they see. And seated in offices in London, Paris, and New York men are charting those observations for the use of all.

But sometimes an aviator will come down with a blanched face. His hands are suspiciously trembling. It may be that he has stumbled across one of the dark secrets of the air, and has been lucky enough to escape with his life. Some aviators go up—but never come back alive. The awful wreckage of an aeroplane, the cinders and debris, are all that the experts can ponder upon for evidence of some new knowledge that came to the pilot simultaneously with death.

I recall Sir Alan Cobham telling of the alarming experience, uncanny in its suddenness, which happened to him when he was piloting a machine over the greatest falls in the world—the Victoria Falls in Rhodesia. He had swooped low over the gorge in order that the cinema photographer might obtain some unusual shots. But he suddenly found himself caught in that queer mixture of air and spray that hangs over this gorge like a

gigantic steel curtain. The engine spluttered dangerously. The machine heeled over and began to dive for that narrow gorge through which the Zambesi tumbles. Only the quick, cool decision of Sir Alan Cobham saved the situation. For a few seconds death stared at them in that leaping spray. Then the machine climbed into the blue. The danger was past.

But Africa seems to have as dark and unexplored a sky as bush and jungle beneath. On his most recent flight in a flying-boat in Africa Sir Alan Cobham passed over that jagged region known as the Mountains of the Moon. He struck a violent storm, and the thirteen tons of the flying-boat were lifted bodily over three-quarters of a mile. Flying blind, and with his wireless apparatus useless, Sir Alan yet succeeded in reaching his goal—Lake Kivu.

Rudyard Kipling once imagined the fantastic idea of an aeroplane flying steadily with a dead man in the cockpit. It may have seemed fantastic in fiction, but it had a cold reality in an occurrence during the war.

One day a group of our men sighted a Be 2/c 'plane gliding towards the aerodrome. The throttle was shut down and the engine ticking over. Instead of circling to land into the wind, however, the machine kept steadily on and passed over the aerodrome.

This was so unusual that the men instantly suspected that the Germans were landing a spy in a captured machine. A dozen men armed with rifles and bombs jumped into a motor-lorry and went off in the direction of the landing 'plane. They found it, still and silent, in a neighbouring field. It had made a perfect landing. Rifles were levelled. An officer in the stalking party stood up and called upon the aviators to surrender. They could be seen sitting in their cockpits. But there was no reply.

Finally one man, bomb in hand, crawled towards the machine. Still the figures in the cockpits did not move. It was then there came the revelation that they were dead. They had been shot in the sky and killed almost instantly. Yet the machine had actually flown them home and landed them safely without any damage to its structure.

There are moments when the sky-high aviators are almost ready to believe in the existence of strange monsters, jealous of their domain of the upper-air. Sensational fiction is apt to

become fact. Sir Arthur Conan Doyle once wrote a powerful story describing the discovery of monsters floating in the upper atmosphere by an aviator who had searched them out in their aerial lair. The wreckage of his machine was found in a field later. But the aviator's body was never discovered.

Even the most hardened of aviators, the man who has experienced all kinds of difficulties in the air, must find his nerve shattered when some huge bird, eagle or condor, swoops down angrily upon the flying-machine that is trespassing in new regions.

Colonel Lindbergh himself has experienced that nervousness of the airman when attacked by a bird. Not very long ago he was flying between Miami and Flagler's Beach in the United States. A huge gull suddenly swooped down and crashed into the 'plane. Lindbergh felt something strike the 'plane, but could not discover anything. The machine continued to fly perfectly, but the aviator himself felt his nerves stretched to a tension. As he explained afterwards, it made him feel uncomfortable not to know what had happened. When he landed at Flagler's Beach he discovered the cause of the impact. There, hanging from the fabric at the leading edge of one wing, was a gull, its head forced firmly inside the fabric.

Eagles particularly resent aeroplanes in their domain. Again and again they have attacked aviators, and usually suffered most in the battle. But there have been occasions when they have so mixed themselves up with the propeller that the machine has stalled and hurtled to the ground.

Eagles usually prefer to attack from the front. Recently, however, a German eagle made a flank attack on one of the mail 'planes. He swooped for the pilot but hit the metal covering of the wing. Then he hurtled to earth with a broken neck. There was a large dent in that metal wing, and the passengers were left feeling rather uncomfortable.

On my way home from Capetown I travelled northward from Johannesburg in that stalwart old D.H.66, the *City of Delhi*.

Shortly after leaving Salisbury, and as we were gaining height through the clouds, something struck the plane a violent blow, and we duly returned to the aerodrome to see what damage, if any, had been done. The D.H.66 was uninjured, but a full sprinkling of blood and feathers on the prop-boss of the

centre engine told us that some big bird—probably a kite—had challenged something a bit too big.

Now that Imperial Airways are flying the long African route, the pilots are meeting new problems every day. Recently an airman in East Africa was forced down through a locust getting into his induction pipe. It was a unique air experience. Locusts generally are not found at any great height, and so it would appear that this danger, like many others, can be avoided by flying high.

But on the African airways the altitude is great enough as it is, as many of the landing-grounds are between 4000 and 5000 feet. And there are certain air regions in Africa through which even the bravest pilots will hesitate to fly. There is, apparently, no reason why these dark regions of the air should be any more dangerous than the dark jungles beneath. Yet airmen have their superstitions and definite dislikes as much as have sailors of the seven seas.

Flying above the jungle, particularly at night, is a nerve-racking business. Airmen often develop a queer dislike of certain regions and can never properly explain the reason. During the war I knew a R.F.C. recruit who was obsessed with the danger of flying above a certain clump of trees on a hilltop of Salisbury Plain. He had confessed this fear to me and been laughed at. Three days later his machine crashed, inexplicably, while flying above that clump of trees. The young pilot was killed and none of the experts could explain why the machine should have stalled at that particular place.

I wonder how many of these strange regions of the upper air exist over the Atlantic? Many brave men and women have gone to their death in these lonely unexplored skies. It would seem that somewhere north of Newfoundland is a Sargasso of the air, luring the flying-ships to their doom. Is there a port of missing 'planes?

The great sky is still a mystery domain. It is the region for the explorers of the future. A thousand and one adventures are yet to be experienced there, and its secrets brought back to earth by the intrepid. And for these reasons, if no other, the airmen of the world admire the spirit that sends experimenters such as Professor Picard into the unknown regions above.

CHAPTER II

AT CROYDON

I

COMING into a city from the sky is an adventure that never loses its thrill. The travellers of yesterday always advised entering a city at night. A civilized city is, like a woman, at her best in the evening.

But these travellers of yesterday were merely apologizing for railway stations. There are few railway stations in the world that can be said to be truly beautiful. Usually they are windy spaces with waiting-rooms fit only for suicide pacts. In Europe, alas, we have not yet reached the cathedral-like beauty of the Pennsylvania railroad station of New York.

Aerodromes, however, need no apologia. They have the clean, straight-lined beauty of simplicity of to-day. And the take-off or arrival of the giant air-liners, their silver wings and the glistening metal bodies, all combine in making the modern aerodrome a place of never-ending interest and delight.

Those who assert that machinery is destroying romance should stand on the tarmac at Croydon and see the arrival of the Imperial Airways liner from Paris. A roaring giant of the clouds swishes easily to earth. Once landed, this mechanical colossus seems to roar its delight. The machine taxis towards the customs-house. Steps are wheeled out, and the cabin door opened. One by one the passengers descend.

There is romance in plenty here. And the modern aerodromes make the entry into a city in daytime much more exciting than at night. For the aeroplane, like the cinema, has increased mankind's vision. We do now possess the bird's-eye view denied to the artists of yesterday. We can see a city from a godlike altitude.

It is, perhaps, too soon to expect our artists to give us on canvas these visions of the air-people. It is extraordinary that

some of our artists have not abandoned their studios for the cockpit of an aeroplane. There was a time when painters were advised to take their canvases and palettes into the street and paint life, rather than the unreal nudes posed in a studio. Let us hope that in the near future they will take their canvases into the sky. Would the great landscape painters of the past—Turner, Constable, Millet, and those Dutch geniuses—have been able to resist the magnificent view as glimpsed from an aeroplane? Here is a realm that demands the inspiration of a modern artist.

Germans have made their aerodromes the most modern and appealing in Europe. Yesterday in Berlin one sat in the *biergarten*, drinking lager and listening to an orchestra playing "The Blue Danube" for the eighth time during the afternoon. To-day, Berliners sit at the café-tables adjoining the Tempelhof aerodrome and watch the arrival of metal machines from London and Moscow, Paris and Constantinople. An afternoon at the Tempelhof is an exhilarating afternoon.

But London's own aerodrome at Croydon presents an exciting spectacle for the modern mind. There, too, is a constant arrival and departure of 'planes to the distant places of Europe. Flecker and those Victorian romantics who rhapsodized about the road to Samarkand and its dusty baggage camels had not experienced the skyway across Europe. As one who has adventured many strange routes I can faithfully say that there is more poetry in a flight to Rome than there is in a motor-car journey across the Syrian desert.

It is inevitable that Croydon be called the Clapham Junction of the air. But this belittles Croydon. Clapham Junction has never had anything of the importance that now attaches itself to this great air-port. The rapid growth of air travel, the increasing size and power of aeroplanes, the growth of air-mindedness among the people, has already expanded Croydon aerodrome beyond the limits dreamed of by the originators.

To-day Croydon air-port is one of the mechanical wonders of the world. Although it is over ten miles outside London, those miles have their purpose. When in 1920 the London air-station was moved from Hounslow to Croydon, it was believed that the new aerodrome was outside the fog area. Fog is still

a great enemy of aircraft. But it says much for the inventive and mechanical genius of air engineers that fog is being fought in the air as successfully, if not more so, than on the railway and at sea.

To-day when you motor from London along the Purley Way and enter this field of modern marvels, it is difficult to realize that it was only officially opened in 1928 by Lady Maud Hoare, wife of the then Air Minister, Sir Samuel Hoare. To-day, on a field where once it was a great adventure to essay a flight to Paris, gigantic machines now purr in readiness to begin the flight to Karachi in India or Cape Town in South Africa. From Croydon to-day you may fly anywhere.

All aerodromes are best seen from the sky. I have descended at Croydon from a sunshine sky and seen the luscious green of English fields in summer-time stretching beyond. Red roofs nestling beneath trees. A patchwork of red and green and grey. Zigzag roofs, white hangars, the wind bellying one of those long white tubes known as "socks", a ribbon of black road—that is my impression of Croydon from above. As the machine banks and comes skimming down, the control-tower, where the real brains of the airway are located, is a prominent object. There is something uncanny in the thought that your pilot has been talking to someone in that control-tower while the aeroplane was crossing the Channel at 3000 feet.

I have also descended at Croydon from skies heavy with clouds and lashed by the wire-streaks of rain. Then the landing has been more cautious. Exciting, too, have been the times when the pilot has looked down into a pall of fog for the flashing lights that signal to him his landing directions.

This lighting of aerodromes has now become an exact science. It permits not only night-flying, but also flying in fog. It means more to the air navigator than the lighthouse does to the captain at sea. Different coloured lights are also installed for the use of air-pilots. Orange and red are the colours which are best visible to the men in the sky.

But most pilots making for Croydon from the Continent look out for that sky lighthouse which stands at the entrance to the Redhill Valley in Kent. This is a new type of 3 kw. electric beacon, and has been erected on a tower. Its candle-power is 70,000, and its visibility 50 miles. It flashes in Morse

code the letter M and is operated by day during conditions of bad visibility, and by night from sunset to sunrise.

Croydon aerodrome at night is a glittering paradise of high-powered lamps. Bright lights gleam from the roof of every building, and searchlights finger the sky. An illuminated indicator displays the way of the wind-drift. Across the field is the gigantic neon beacon. To add to these static devices there are wheeled searchlights. Lights are transported about the ground on caterpillar tractors. They can be moved to any part of the aerodrome and fling their light skywards. Should these innumerable devices fail, there is a firework display of Verey lights, star-shells and white rockets ready to be sent screaming into the night.

But if you would glimpse the robot-like brain of the modern aerodrome, it is necessary to enter the control-tower—a strictly guarded privilege at Croydon. One can understand the reasons for the secrecy. There are some unthinking motorists who will stop their car alongside a policeman engaged in traffic management and ask him the route to the other end of the town. There are people who will be granted permission to enter the signal-box of a railway and by an animated conversation with the signalman may endanger the safety of the road down. There is no time for such people in the control-tower at Croydon. The management of air traffic is an occupation calling for skill and concentration.

The men in the control-tower have from their big windows an uninterrupted view of the aerodrome and the sky. It is, in reality, a glass-enclosed room about 30 feet square, and perched some 60 feet above the ground. An observation-platform surrounds it. It can safely be said that the control-tower at Croydon is the finest in Europe. It possesses all the latest devices and is managed by men whose knowledge is at the command of all pilots winging their way within a radius of 200 miles.

The tower is divided into two sections, a control-room where the controlling officer is on duty at all times, and the wireless-room where the wireless-telephone and direction-finding installations are found. A glass partition divides the two.

The control-officer is all-important. From a terrifying-looking switchboard he controls all the lights of the aerodrome.

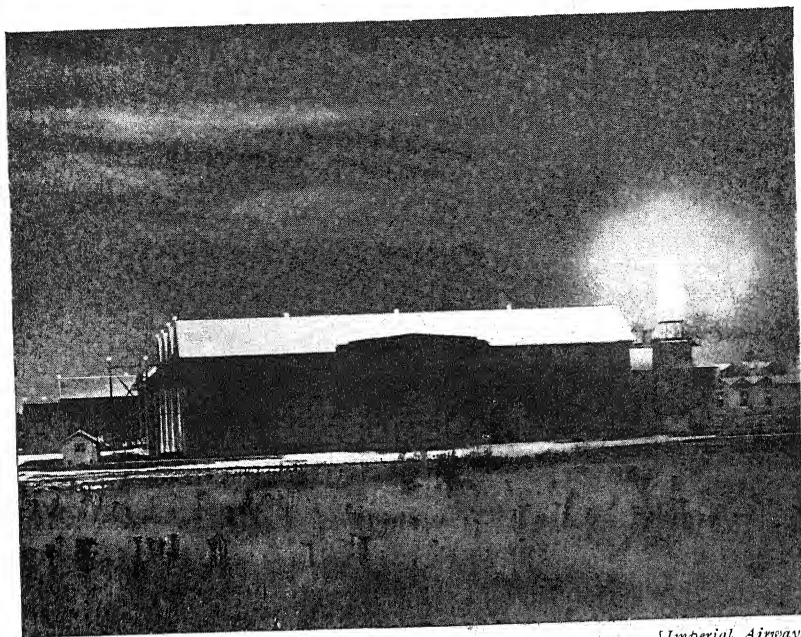


Photo by courtesy]

[Imperial Airways

CROYDON BY NIGHT SHOWING THE "NEON" BEACON

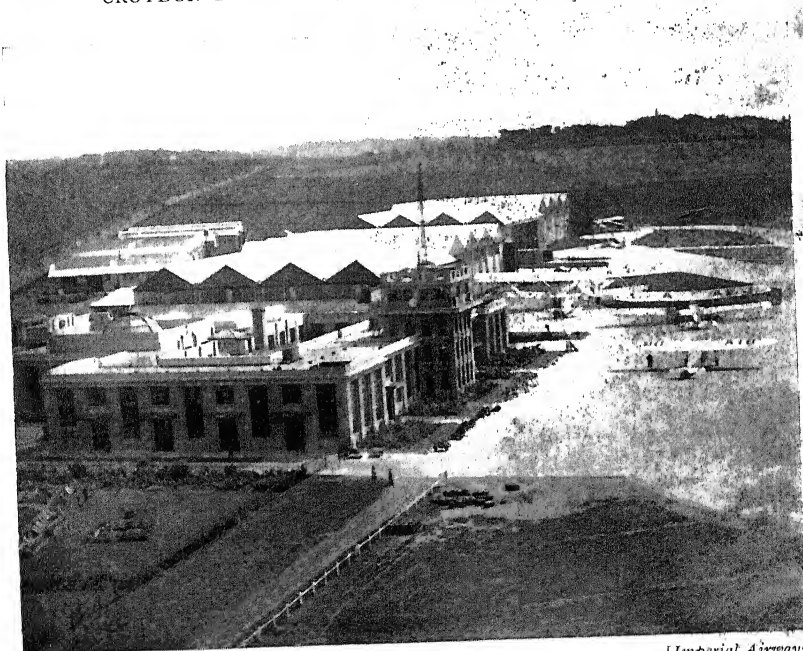


Photo by courtesy]

[Imperial Airways

CROYDON AERODROME BY DAY

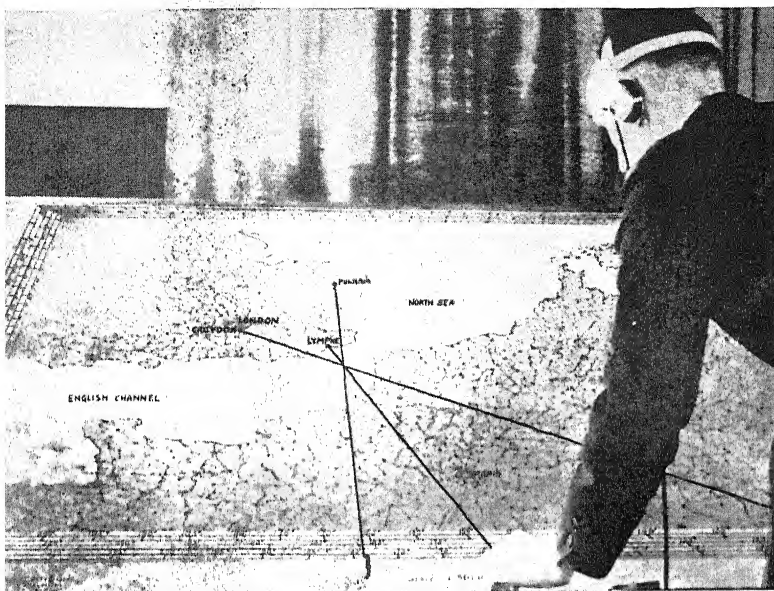


Photo by courtesy]

[Imperial Airways

POSITION OF PLANE BEING DETERMINED FROM BEARINGS GIVEN BY THE
PILOT TO THE CONTROLLER AT CROYDON

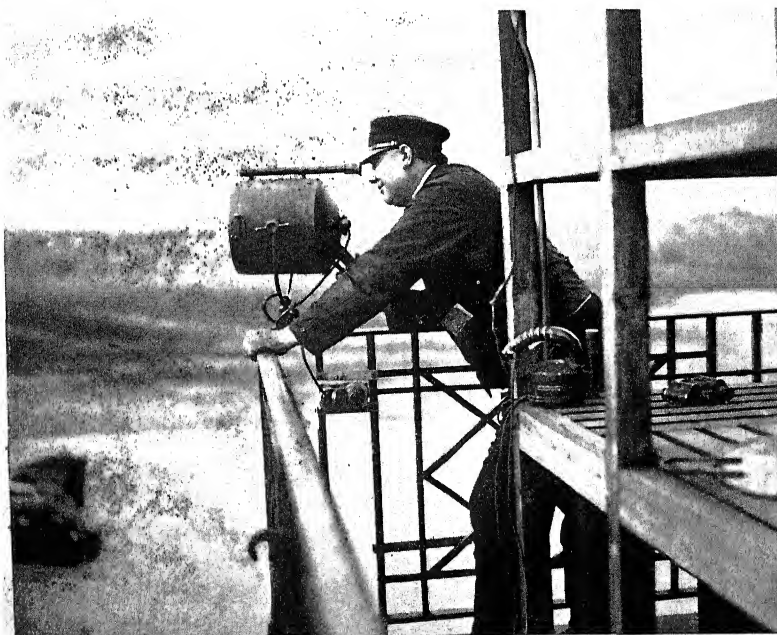


Photo by courtesy]

[Imperial Airways

LOOK-OUT MAN ON CONTROL TOWER

He can flood the field with white, orange, red, or neon light with a flick of his wrist. Or he can, should he so desire, plunge the aerodrome into complete darkness.

Behind him on the wall, and spread on tables, are the airway maps of Europe. Those definite air channels through which plough the liners of Imperial Airways are plainly marked. The control-officer has little need to look at them. His imagination visualizes that patchwork quilt of country beneath the aeroplane. He has flown the routes and knows them by heart.

This is the man who talks with the pilots as they sit in their cockpits in the sky. He tells the incoming pilot or his wireless assistant whether he can land, if the aerodrome is clear, or his exact position over Southern England, should he have got lost. The outgoing pilot whose machine is roaring on the ground ready to take off must watch that control-tower for the necessary signalled permission. A nod from the control-officer, and a large metal disc bearing the initials of the air-liner's company is hung over the side of the parapet. This is the signal to the airman, who has already adjusted his headphones and is ready to talk to the control-tower as soon as he is in the air. A few seconds later and he is skimming from the ground.

Maps and wireless telephones are the robots at the command of the navigating officer. He is in direct touch with two other wireless stations, one at Pulham in Norfolk, and the other at Lympne in Kent. Each of these stations, like that of Croydon, is provided with the most up-to-date direction-finding apparatus and wireless-telephone equipment.

Beyond the other glass partition is the wireless-room. Two wireless operators are seated before a many-valved radio panel. They are the receivers and senders of messages into the skies. They are in touch with every machine that is flying to and from London. A pilot can tell them the weather he is experiencing at the moment, his exact height, engine revolutions and speed, and the probable time of his arrival. When a pilot calls up Croydon he automatically gives the registration letters of the 'plane, the company, his name, his destination and other details. Despite the roaring of the engines and the howling of the wind, his voice is heard quite clearly.

Yet safety in the air is essential. Messages sent by pilots from Imperial Airways machines are repeated each time each of those wireless operators hears it, and one of them reads it over and obtains confirmation from the pilot. The pilot's report is then written down, sent to the control-officer, who enters it in a log-book. At the same time, as a further precaution, a loudspeaker has been bellowing the pilot's speech in the officer's own room.

The control-officer then moves to a large-scale map on a table and pins a flag to the point where the aeroplane is moving. These flags are constantly changing. But one glance at that map can reveal to the control-officer the exact position of all aircraft. He studies it for a moment. He sees that three aeroplanes are approaching the Channel from different sides. The weather is cloudy; and it may be that some of the machines are flying blind. To avoid possible accidents he begins to issue orders to the different pilots so that each instinctively alters his course or raises or lowers his aeroplane to the altitude demanded by that man sitting in a room close to London.

Voices go sounding through the ether.

"Imperial G-EBBA. Hello, Imperial G-EBBA. Croydon calling. Croydon calling. Fly at 5000 feet steady. 5000 feet steady . . ."

The pilot of the Imperial Airways machine that is flying from Paris to London and has just passed over the French coast immediately glances at his altitude indicator. He begins to climb. Soon he is at 5000 feet. He is passing through mist and cloud, and cannot see far ahead. But he knows that he is in a safe strata of the air and in no danger of a collision with the aeroplane that is crossing the Channel from England so long as he obeys that voice from the control tower.

Another pilot is lost. He begins to shout into his telephone.

"Hello, Croydon. Hello, Croydon. This is G-EBT2 speaking. Give me position and direction, please. Direction wanted."

The loudspeaker in the control-officer's room bellows the voice lost in the sky. The wireless operator tells him to keep his generator running for half a minute.

So the lost pilot hears a voice asking him to continue transmitting. He does. As his machine races through the sky, the

wireless operator tunes with the dial and gets a bearing. It is a matter of a minute. Immediately the position is plotted, the reply from Croydon goes out.

"G-EBT2. Hello, G-EBT2. Croydon calling you. Croydon calling. You are now two miles due south of Sevenoaks. Two miles due south of Sevenoaks. . . ."

And the pilot stabs his thumb at the position on the map that is before him in the cockpit. A few seconds later and he is heading direct for Croydon aerodrome.

A splendid example of what wireless position-finding can do was experienced by the Prince of Wales when returning to England in an Imperial Airways machine. The Prince travelled in one of the three-engined Argosy machines. Despite the fog that existed on the French coast, and also in the Channel as well as in England, the Prince decided to leave Paris. The journey was an urgent one.

The pilot of the Prince's machine was Captain O. P. Jones. On leaving Paris he manœuvred the giant machine out of the fog and into the blue belt of sky above. In a few minutes they were bathed in sunshine. And in that sunshine they flew at a speed of 100 miles an hour direct to Croydon. No land or sea could be seen beneath. Throughout the journey the pilot was in constant touch by telephone with Croydon. They gave him his exact position at intervals. When he reached a point where the fog still screened the earth beneath, the wireless informed him he had arrived. He then piloted the machine downwards and landed at Croydon in record time. The Prince was particularly struck by this marvellous demonstration of wireless telephone direction.

II

More human, and thereby, perhaps, more fascinating, is the pilots' room at Croydon. There, in a comfortably furnished lounge, one meets these wind-tanned men of the air. They sit and talk between flights. Shop talk. But the talk of airmen, devoid of technicalities, can be amongst the most exciting in the world.

These men who pilot the giant machines through the clouds

are well worthy the study of a psychologist. Spare of speech, their eyes far-winkled through gazing at endless horizons, they have something of the lone self-sufficiency that one finds in forestry officers in India, in the men of the Canadian North-West Mounted and the pioneers of Northern Rhodesia.

Hear them talking :

"Hello, D.G. ! I'm just in from Cologne. Dirty above the Channel. Passed old Horsey taking the Paris mail. Anybody seen Thripps ?"

"Saw him in Cairo, a week ago," growls another. "Looks sunburnt and happy. If you want to see him you'll have to flip over to Nairobi."

"Comment ça va, mon vieux ?"

A pilot of the French airways is saluting a German airman.

"Ach, mein Kamerad ! Was machst du hier ?"

"... And he's talking now about buying a Moth and flipping across the Atlantic."

"Well, he can do it."

"Says you !"

It is difficult to get to know these airmen. They are all reticent and shy. And most of them drink coffee. Several of them are famous war aces. That race of sky men who were youngsters in the air, who manœuvred against each other machines that no expert to-day would pass as safe, who rattled machine-guns at each other and dropped bombs with fiendish accuracy—there are not many of them left to-day. But those who are alive are still in the air. The sky is in their blood. And they have a camaraderie of the clouds such as is unknown to the men on the earth.

There is a famous trio of pilots among the Imperial Airways men. You will find them occasionally in this furnished lounge which overlooks the tarmac at Croydon—Olley, Wilcockson and Rogers. Bill Rogers is the comedian of the skies. He has a Cockney wit that is never at a loss. If he descended in the middle of the Sahara, depend upon it he could persuade, by gestures and a London loquacity, any marauding Arabs in the vicinity to help him to get his machine into the sky again.

Rogers was a sergeant pilot in the war, and for the last eighteen months of it was attached to the Ferry service,

which was detailed to fly new aeroplanes over from England to France to replace casualties.

Olley is a man who seems to have been born with the scent of petrol in his nostrils. It is possible that he was discovered in the first aeroplane that ever flew in England. Nobody quite knows how long he has been at the game. Certainly he can tell stories of piloting the early Handley-Page machines when civil aviation was in its infancy.

I had a great night with Olley in Shepherd's Hotel, Cairo, recently. He had just returned from flying an American millionaire on a big-game shoot in the Serengetti Plains, that paradise for all big-game hunters in Kenya. Olley was celebrating his return, but his wife was with him in Cairo to see that he did not celebrate over much.

Captain Olley is the special charter pilot of Imperial Airways. He is liable to be sent to any part of the world at a moment's notice, and he knows the airways of the world as well as most Londoners know the map of the Underground. He has flown Dutch machines as well as British, and has carried about 40,000 passengers. If you ever read in the newspapers about someone making a spectacular flight by Imperial Airways machine to catch a liner sailing for America, you may depend upon it that the pilot is Captain Olley. A cheerful, jovial man, tremendously enthusiastic, and happiest when in the air.

As for Wilcockson, he is a most knowledgeable pilot. He has that uncanny sureness of the born aviator. He prefers to talk technicalities and weather lore rather than the ordinary small talk of clubs. With Wilcockson at the joy-stick I would be happy even in the worst storm that can rage over the Channel. "Wilky" Wilcockson is considered the tallest and broadest of Imperial Airways pilots. During the Great War he was in the R.A.F., as indeed were many of these pilots. In 1919 he demonstrated English aeroplanes to the Polish authorities so brilliantly that he was made an honorary member of the Polish Air Force. He flew the first machine ever fitted with safety slots, and was a pioneer in blind flying. He has one incurable vice—golf. As soon as he can get away from the tarmac at Croydon he does, with a bag of golf clubs slung across his shoulder. I even suspect that he carries them with him on his regular flying route.

Of the pilots of Imperial Airways it might be said that they are all "safe" men. They do their adventurous work in an efficient, almost cold-blooded manner. They are forbidden to "stunt"; They are not even encouraged to become "darlings of the skies"; like those lone aviators about whose achievements a public reads much deathless prose. I have had the greatest difficulty in persuading Imperial Airways to talk about their men, and more so in persuading the men themselves to talk.

One of the veteran pilots is Captain Walters. There is a distinct nautical flavour about the man's appearance. And he gives one that same feeling of confidence as does the skipper of a huge Atlantic liner. Captain Walters is effectively taciturn, thick-set, short, clean-shaven, good-looking, middle-aged, and married. His hair is going grey, and he has a distinguished record during his fifteen years' flying. During the Egyptian outbreak in 1919 he flew the mail service between Cairo and Alexandria. He has done 6500 hours in the air.

It is astonishing to find that most of these pilots are middle-aged, and most of them are married and possess families. I even suspect that in between flying they live very ordinary suburban lives. And surely that in itself is sufficient to give confidence to those thousands of passengers who even to-day seem to need it.

The most picturesque-looking of all the pilots, and one behind whom I have flown many times, is Captain Oscar Jones. Because of his beard he is known to all in Imperial Airways as "Captain Kettle". He is five feet six and a half inches, thick-set, and has flown the best part of 10,000 hours in the air.

Herbert Perry is a good antagonist for Rogers in the lounge at Croydon. He again is small and short, and looks as though he ought to be stamping the bridge of a tramp steamer. He was born in Birmingham and is stubborn but calm. He will fly in all weathers, and, just to show you that he has confidence in himself and the 'plane, will admit that he has five children.

All these pilots refer to the Channel as "the Ditch". And one who flew it regularly for many years I met in the middle of Africa during my flight to the Cape. He is Captain Dudley Travers, whose heavy jaw is terrifyingly determined on first acquaintance, but who afterwards reveals himself as mild

and friendly a man as ever possessed a jaw of that kind. Although one of the youngest of the pilots—thirty-three—he was, at the moment I met him, senior pilot on the African route. His blue eyes and capacity for funny stories appeal very much to the women who fly. The women are always slyly charming when he is taking a meal with the passengers at some rest-house in the middle of the African route. I have to thank Travers for one of the finest glimpses of thousands of pink-bellied flamingoes scuttering across a lake in Kenya that any one could hope to obtain. He brought the machine to within reasonable distance of the surface in order that one of our passengers might take a movie film of this beautiful and spectacular flight of birds.

I suspected Travers of pining to be back on the Channel Service. He seemed to prefer bad weather and clouds to eternal sunshine. Not so Sam Wheeler, who graduated to the position of pilot from being a mechanic. Sam Wheeler has spent nearly all his time on Empire service. "Flying the Ditch is pretty monotonous" he says. "I prefer the African or Indian route. You've more problems to face, which means that there's more to think about. Besides, you get more flying pay." A matter-of-fact fellow is this broad-shouldered man whom everyone calls "Sam".

In the same class is "Jimmy", which is what everyone calls Captain Youell. He began his career at the age of fifteen with the miserable job of mending punctures at the Beatty Flying School at Hendon. But at sixteen he materialized into a flying instructor and then had a hectic series of adventures during the war in the R.N.A.S. He brought down many an enemy machine. He was the pilot chosen recently to fly the Prince of Wales and his suite to Copenhagen from Croydon. He was one of the first pilots to fly across the North Sea to Sweden, in which country he met the woman who is now his wife.

Another pilot who survived a thousand and one adventures in the air during the war is Fred Dismore. Fred is round and tubby for his five feet seven. All these pilots are troubled in this direction. They tell you that flying prevents regular exercise, and that sitting at the joy-stick is not particularly good for the liver. Fred Dismore went out to France in October

1914 with the British Expeditionary Aircraft, and survived the war without a scratch. He is surely one of the earliest pilots in work to-day. His pilot's certificate is dated August 5, 1913.

But they are all fine fellows. I wish I could go on telling you of the many I have met—Donald Drew, who pilots a flying-boat; Captain Prendergast, who piloted me from Le Bourget to Cairo, across the Mediterranean to Africa, and gave me one of the real good adventures of my life; Captain Caspareuthus of the South African section; and "Tich" Attwood, the smallest of all pilots, of whom it was whispered that he had to stand up at the controls when his machine was taking off, nevertheless as brilliant a pilot as ever was made. But you will meet most of them in the pages that follow. They are among the salt of the sky.

It is in this room at Croydon, too, that one hears of the extraordinary adventures of the foreign flyers. There are stories of the French pilots of that famous route from France to South America organized by the Aero-Postale. Over that sandy stretch of no-man's-land in Africa known as the Rio de Oro pilots must fly by night to avoid the sharp-shooting rifles of the Arabs in this vicinity. Woe betide the pilot who has to make a forced landing in this area. The Arabs hold him to ransom and do not hesitate at torture to enforce their demands.

German and Dutch pilots who wander into this lounge at Croydon seem swathed to gargantuan proportions in leather coats and sweaters. The Royal Dutch Air Line, the K.L.M., have some spectacular pilots in their service. There is Vandyk, the man who flew the Atlantic in company with the Australian Kingsford-Smith. A middle-sized man, aged about 40, he has the quiet style of a man who ought to be satisfied with four acres and a cow. At the same time, within him is a restless search for adventure.

Smirnoff, a Russian who served with the Russian Air Force both in his own country and in France, is now one of the K.L.M. pilots. He holds several decorations for bravery, and completed his war service in the Royal Air Force. Demobilized, he refused to become a café-drifter in Paris or Berlin with other Russian emigrés. He is considered one of the best of the K.L.M. pilots.

Occasional visits are made by Sillevius, one of the testing pilots of the Dutch air services. To him is the nerve-racking ordeal of taking new Fokkers into the sky, throwing them about, twisting, turning, diving, spiralling, straining every part of the metal machine to make it airworthy. He bears a charmed life, and grins indifferently each time he has to go up.

The Germans, too, have some magnificent men among their air crews who are well known in this rendezvous from the sky. The Germans rightly pride themselves on their remarkable efficiency. I have flown to Berlin in the Luft-Hansa machines, and marvelled at the clockwork certainty with which they descend at the arranged aerodromes en route. The German air lines are now among the most up to date and extensive in Europe.

There is Limbach, an ex-war pilot, big but not boisterous. Indeed, he is so quiet that, if it were not for his size, he would be unnoticed in any gathering of men. But this wonderful pilot has an immense mileage to his credit, and holds the honoured position of president of the Union of Air Pilots in Germany.

Then there is Kahlow. He piloted the first German commercial aeroplane to Croydon after the war. For his bravery in the sky during the Great War he was awarded the Iron Cross. He is now a happy, jovial, civil air pilot, with a fund of good stories.

Gutschmidt is the smallest of the Germans who walk into this room. The King of Spain decorated him on the opening of the first Spanish air line. He holds the Spanish title of "Don". Gutschmidt is considered one of the best night-fliers in the world.

Among the very likeable group of French pilots at Croydon is Captain Bajac, a big, burly man as unlike the average Frenchman as is possible. But his exploits for France are legion. They would make a book of startling adventures. He has been decorated for bravery again and again, but I think he is far prouder of the fact that he has flown for nearly 7000 hours without serious mishap.

Then there is Captain Codos, a pilot with at least three world records to his name. He is the airman who is always accompanied by Costes, the great French airman who recently flew the Atlantic.

Finally there is Captain Corsin, who was fighting as a boy of fifteen in the infantry during the Great War. Captain Corsin has also achieved a flying record, that of being longer in the air than anyone else in France.

They are worth meeting, these men of the sky. Bluff and hearty, quiet and indifferent, they sit and talk indolently with each other in the few moments that they have between flights. A drink, a smoke, and then one will grab his flying-helmet and stroll to the door.

"Au revoir. Bon voyage, mon vieux!"

"Auf wiedersehen!"

The door swings to. Out on the tarmac the roar of mighty engines sounds. The pilot climbs into the cockpit. One glance at the control-tower, a wave of the hand, and the giant machine moves forward.

A moment later it is triumphantly speeding through the air

III

And what of the queer cargoes and passengers carried by these pilots and their giant 'planes? I have devoted another chapter to the bullion 'planes, those aeroplanes that carry gold from country to country and bank to bank, as well as prospectors who are seeking gold in the wilds.

But many are the queer cargoes now transported casually by air almost every day. Recently, for example, a false beard was rushed all the way from Croydon to India so that some desolated actor could play his part in time.

The old saying that pigs might fly is now a reality. Pigs do fly. They have even gone by air to the slaughter-house. And prize cattle have been flown to take their proud place at some cattle show. It is not every day that cows and heifers are cajoled into aeroplanes at Croydon, but it does happen.

Air liners, in fact, have become flying Noah's Arks. The animals that are carried by air often show less anxiety and nervousness than when travelling by train or ship. But they still tell a breathless story at Croydon of a tiger that insisted upon a good look round at the interior of an Imperial Airways freight machine before it could be induced to settle.

The London Zoo receives numbers of animals by air. One fine chimpanzee which recently came across travelled on an ordinary passenger's ticket, and it is said that a clerk had mistaken him for a professor of zoology in a fur overcoat. Once a cargo of bees broke loose while being unloaded at Croydon, and even pilots took safety in the air.

The flying-boat in which I flew from London to Cairo, across the Mediterranean, carried a barrel of Colchester oysters. These were a godsend to many English gourmets, and on the evening of our arrival a special oyster party was held at Shepherd's Hotel. On another occasion, when in the heart of Africa, I was asked to purchase a leopard cub and told I could transport it with me on my return journey to London. But I felt that travelling with a leopard cub, daily growing, would be a little too exciting.

Lions with wings may have been an imaginative fiction to the classical mind, but they exist in reality to-day. Once there arrived at Croydon from Paris an Imperial Airways freight 'plane which had been converted into a lion's den. A strongly barred cage had been built into the fuselage, and in this reposed a lion which, with the exception of the trainer, was the solitary passenger, bound for a circus in London.

The lion proved a most docile passenger. One might have expected lurid excitement over the Channel, but the beast merely yawned. On arrival of the 'plane at Croydon, a wheeled cage was brought up to the 'plane, a door was opened, and the lion calmly walked from the machine to the cage. It was an experiment that decided both zoo and circus authorities that wild beasts should always go by air.

Racehorses are taken between Paris and London. Horses that have thundered past the grandstands of Longchamps or Auteuil are sometimes brought here by air to take their chance on English racecourses. Also crates of racing pigeons have been carried by Imperial Airways 'planes.

Birds in flying-machines may present a paradoxical scene. But there have been occasions when the aeroplane has been utilized to save bird life.

During the rigours of a winter migration aeroplanes carried large consignments of swallows from Austria and Switzerland,

over the snow peaks of the mountain ranges, towards the pleasanter skies of the south.

How people of Vienna, faced with real hardships among themselves during the winter of 1931, nevertheless made a determined and co-ordinated effort to save a dying migration of thousands of swallows is well worthy of recording.

An unusually early and heavy fall of snow had occurred. These blinding snowstorms brought death to the swallows migrating from the north of Europe to the sunny lands south of the Alps. The birds began to fall and perish by the thousand over the Simplon route of the Alps, while others reaching Vienna descended on the city and dashed themselves against doors and windows trying to reach the warmth within. In clouds they descended on houses and buildings. Public parks and the Wiener Wald, a range of low, wooded mountains near Vienna, became alive with the starving and shivering creatures.

Then the people of Vienna awakened to this bird tragedy which was happening in their midst. Swallows became the concern of everyone. The birds, numb from cold and hunger, were picked up by the thousands and carried in hands, cages, boxes, baskets and handbags to the headquarters in Vienna of the Austrian Society for the Protection of Animals.

The Society had not anticipated any such invasion. Nevertheless, they rose to the occasion. Throughout the offices and other rooms wires were strung and perches improvised with scaffolding. The birds were allowed to flit about the place and food was given them. Very soon more thousands of birds arrived. A queue of people, rich and poor, stood outside the offices each with distressed swallows in their possession. The very rich sent their maids and footmen and chauffeurs with the birds that had been picked up on the big estates outside Vienna.

It was then that the idea of transporting the swallows a further stage on their long journey by air occurred to one of the officials. The Austrian Air Transport Company were approached. They offered to carry the birds by aeroplane to Venice. The Society gratefully accepted. Venice was much warmer, nearer the sea, and flights of swallows had been seen heading in that direction.

The departure of the first big Junkers' plane with its cages



1



2



3



4

Photos by courtesy]

[Imperial Airways

SOME WELL-KNOWN PILOTS

- | | |
|------------------------------|-------------------------------|
| (1), Capt. D. Drew ; | (2), Capt. A. S. Wilcockson ; |
| (3), Capt. A. B. H. Youell ; | (4), Capt. L. A. Walters. |



1



2



3



4

Photos by courtesy]

[Imperial Airways

MORE WELL-KNOWN PILOTS

- (1), Capt. F. Dismore ; (2), Capt. W. Rogers ;
 (3), Capt. O. P. Jones ; (4), Capt. H. H. Perry

of swallows became a civic event. The mayor of Vienna saw the birds off, and handed the pilot a letter to the mayor of Venice. The first aeroplane carried 2000 birds in specially designed wooden crates. On arrival at the Venice aerodrome the birds were given a civic welcome. The mayor of Venice, after a grateful speech, released the birds. They immediately swarmed into the air. Some perched upon telegraph wires. Others flew round in circles, evidently seeking their bearings, and then began to fly further south.

More aeroplanes with more swallows, often as many as 25,000 at a time, followed the first from Vienna to Venice. Others were carried by air as far as Constantinople. The saving of this huge migration of swallows from perishing in the early winter storms of Europe was one of the grandest gestures that bird-loving man has ever made. Its effect upon the Austrian Society for the Protection of Animals, however, was disastrous. The aerial freight charges to Constantinople ate up all their meagre funds. Debts accumulated, and the Society collapsed.

Frequently baskets of day-old chicks are found in aeroplane cargo manifests. Thanks to the rate at which the machines in which they travel fly, it is possible for them to reach destinations far distant on the Continent within less than 24 hours after having been despatched from London. A recent cargo of 2000 chicks was flown from London to Roumania. Moreover, when grouse-shooting begins on the Yorkshire and Scottish moors, the kills are often speeded to Croydon, where they are collected by those restaurants who possess wealthy and discriminating gourmet clients.

Food supplies of all kinds are being transported by air in increasing quantities. The speed of the aeroplane enables fruit from abroad to be brought to this country in a much fresher state than is possible by train and steamship. In the future there will be special fruit-carriers, which will fly high and be in a natural refrigerator most of their journey, and real fresh dates, oranges, and the like will be obtainable. And other countries will take other foods. Recently, for example, a cargo of Brussels sprouts was sent to Egypt by the Indian mail plane. Snails usually take life easily, but two million of them every year leave all snail ground records behind as they fly from

Paris for London. Live lobsters are also taken by air, and it is amusing to note that they are insured against crashing and fire.

Kenya coffee-planters now send samples of their crops through to London and the agents in record time. It enables the experts here to decide upon the value of a crop thousands of miles away on the uplands of Africa. Egyptian and Sudan cotton samples are also sent by air. On those samples a big deal may be arranged in Manchester and Liverpool.

I think one of the queerest cargoes that left by air from England to the Continent recently was an aeroplane full of mice. They were bound for Holland for a special mice exhibition, and they were the best specimens that could be obtained in Britain. Which reminds me that an Australian mouse once travelled all the way from Australia to England by air in the machine flown by Mr. Charles Ulm. The mouse abandoned the machine on arrival in England and disappeared.

A few years ago I was the guest of Holland, and, after a final speech at a Rotterdam luncheon, was sent home by my hosts in a Fokker monoplane in obedience to a "Three Line Whip" from the House of Commons.

I was alone, or thought I was, in a four-seater cabin behind the pilot. Passing over Zeebrugge, I leant out to take a photograph, but a sudden bump landed me back into a corner where I sat somewhat heavily on a flimsy-looking box, which crackled as I hit it. Upon close and immediate inspection I discovered, to my consternation, that the box was labelled "Caution—Live Bees."

Luckily they stayed in the box. It transpired later that my companions were some fifty "queens" destined for Scotland.

Mosquitoes, too, now so popular among the medical fraternity for experimental purposes, are brought to London by air. They are imported in little gauze boxes, having been collected in the tropics. Many of them are delivered to the new malarial research station at the London School of Tropical Medicine, where they are carefully tended for experimental purposes by a staff of doctors. Insects, in fact, are often rushed like troops to a battlefield. An aeroplane consignment of 20,000 ladybirds was recently sent from California to Florida to cope with an insect pest which was devastating the orange and grapefruit groves.

But then, American aircraft often carries queerer cargoes than those seen in England. Not very long ago a happy family left the Miami, Florida, aerodrome for the West Indies in a Pan-American Airways 'plane. Places had been reserved for 250 chickens bound for Trinidad, 106 goldfish and four Persian kittens for Porto Rico, and a Scotch terrier for the Dominican Republic. Also, as a make-weight, five human passengers.

Several shipments by air of a Peruvian insect which is a natural enemy of the sugar-cane borer have been made from South America to Louisiana over Pan-American Airways. The mortality of the beneficial insects is much lower by this method than by any other means of transport.

California flower-growers and fruit-growers are using the airways more and more. Gardenias come into the New York shops in perfect condition and only about thirty-six hours from the source of supply in 'planes of National Air Transport and Transcontinental and Western Air, while shipments of asparagus, fresh figs and other choice fruits are growing apace.

But those who watch the cargoes arrive by air at Croydon see a strange and varied collection.

Among recent consignments of live stock by Imperial Airways have been dogs, cats, mice, pigeons, cage-birds, fish in tanks, bees, turkeys, insects, small bears, lion cubs, rare zoo specimens, and monkeys.

When a big goods-carrying machine alighted at Croydon not long ago, it was discovered that its freight compartment had been transformed temporarily into a flying menagerie, containing parrots, monkeys and a bear, together with a number of tropical fish in tanks. On another occasion the occupants of a large cargo 'plane were a number of live alligators travelling in special crates.

But the staff there were unperturbed. The cargo was dealt with expeditiously and successfully. Occasionally a tank of those strange creatures called "sea-horses" arrive from the South of France, consigned to the London Zoo. Other diverse cargoes have ranged from oil paintings worth many thousands of pounds, loaned to foreign exhibitions, to some pump fittings urgently needed for the Suez Canal. Some wireless valves were sent by air not long ago to the Royal Palace at Bukarest, and a motor party stranded in Africa were supplied with spares in the desert.

But the use of the freight plane is developing. It will not be long before special refrigerating plants are installed in aircraft to preserve food and fruits even during the short time that it takes to fly from farmer to consumer. The business of shipping strawberries from Holland to England, for example, has become so great that the Dutch K.L.M. has had special planes constructed for this type of service. This line delivered in London recently a shipment of orchids which had come over the long route from Java. They were only eight days on the way, and were said to have arrived in the most perfect condition.

Soviet Russia has found two novel uses for the aeroplane. In the far north in Siberia it is establishing fur posts so that the valuable pelts taken in the white wastes may come to civilization in a matter of a few days, or at most a few weeks, instead of the long months required in the past. In Moscow the newspaper *Pravda* has found in the aeroplane a tool by which it can publish matter deemed of special political importance simultaneously in the city of origin, Leningrad, Kharkov and Rostoff. Matrices made in Moscow are rushed to the other cities by air.

Aircraft are not only used for carrying greater and greater quantities of perishable food, but they are being used to help find food and also to protect great areas of food under cultivation. Shoals of fish of all kinds are now spotted from seaplanes or flying-boats, and the fishermen told by wireless where to let down their nets. Flying fish has a real meaning nowadays. The Gulf of Mexico is a great fishing centre, and aeroplanes fitted with special refrigerators which enable a load of 1000 lb. of fish at a time to be carried now rush fish regularly to various parts of America, where it is marketed under the name of "Aeroplane Brand Fresh Fish".

In a thousand and one different ways the aeroplane has proved itself the greatest of all cargo-carriers.

IV

But the greatest of all cargoes, and, incidentally, the most paying, is the mail. One can summarize British air-mail

development by stating that the cargoes have risen from 200,000 letters a year to more than 8,000,000. This, within a period of eight years.

Air-mail letters are the *raison d'être* of air services. It was stated recently in the House of Commons by the Assistant Postmaster-General that the air-mail profits for the past six years totalled £12,350. Although this may seem a small amount, the fact that there is a profit on the air mail is a significant factor in the progress of air services.

It was only three months after the first commercial machine began to fly to Paris that the British Post Office put their official hall-mark on the service by authorizing it to carry His Majesty's mails. That was in November 1919. At that time the world's airways totalled only 3000 miles, and all the aircraft on them did not fly more than a million miles a year. The latest figures show that the world's air-route mileage is now 190,200, and that over all these air-lines during the course of a year more than 90,372,000 miles are now being flown.

It was in August 1910 that Grahame-White climbed into an aeroplane at Blackpool with a small bag of letters crammed in the cockpit. He flew across country for seven miles with Britain's first air mail. Then came the London-Paris service in 1919. Ten years after that came the institution of the Empire air mail from India to England.

In those early days it cost half a crown to send a letter by air from London to Paris. To-day it costs only fourpence, and this same sum will take it to Moscow or Constantinople. Now you can send a letter for 5000 miles to India for sixpence, while for an extra fourpence it will be taken from London to Cape Town, a distance of 8000 miles.

"Time flies—but so does the Air Mail", is the catch-phrase chosen by the Post Office to popularize air transport. And a glance at the air-mail maps and times issued by the Post Office reveals that the phrase is justified.

Bags of mail are motored to Croydon and leave there in the mornings. Machines are roaring and taking off within a few minutes of those bags being put aboard. The letters reach Paris, Brussels, Antwerp, Cologne, or Bâle the same afternoon. Later in the day others are carried to Rotterdam,

Amsterdam, Hamburg, Berlin, and even as far as Malmö in Sweden.

The next morning mails that left London are being delivered at Copenhagen, Danzig, Oslo, Riga, Stockholm, Milan, and Barcelona. Then on the afternoon of the next day air-mails are in Moscow and Leningrad, while on the second day after leaving London letters are delivered at Belgrade and Istanbul. Business-men have not been slow to avail themselves of this fast and cheap means of communication.

The air mail service from this country has now been in operation for over thirteen years. During the thirteen years that have elapsed the services have been gradually extended, until at the present time there are few countries in the world with which Great Britain is not connected, directly or indirectly, by air.

The greatest stimulus to the development of air-mail traffic has been the introduction of the direct Imperial Air services which link up the Mother Country with the Dominions and Colonies. Although a fortnightly service between Cairo and Bagdad was instituted by the R.A.F. as far back as 1921, and was extended as a weekly service to Basra in 1927, the Imperial Services proper were not inaugurated until 1929, when the direct air mail from Croydon to Karachi *via* Athens, Alexandria, and Bagdad was introduced. The distance of 5000 miles was covered in seven and a half days, since reduced to six days, and the principal cities of India were brought within ten days' journey to London.

As a result the weight of letters sent by air rose from 16 tons in 1928 to 105 tons in 1932—an increase of over 500 per cent. in four years—and of these 105 tons, 62 were carried by the new service. The carryings to India itself amounted to nearly 42 tons, or 40 per cent. of the total air letter mail. In 1931 the service was also made available for the conveyance of parcels to India, and this facility is attracting a steadily increasing traffic.

This year, in co-operation with Indian Trans-Continental Airways, Imperial Airways has extended its weekly service from Karachi to Rangoon via Jodhpur, Delhi, Cawnpore, Allahabad, Calcutta and Akyab. A further extension to Singapore will take place before the end of the year.

Recently Indian enterprise has established a connecting service between Karachi and Bombay and Madras, the use of which—in addition to the Croydon-Karachi service—enables a letter posted in London on Saturday morning to reach Bombay on the following Saturday afternoon, allowing the recipient time to reply by the return air mail. By this means an enquiry can be sent to Bombay and a reply received seventeen days later—only three days longer than an ordinary letter takes to cover the outward journey.

At the present time about 1000 lbs. of letters are despatched each Saturday to India, representing over 6 per cent. of the total letter mail for that country, and about 100 lbs. of parcels. There is therefore still much scope for the development of the service as its benefits become more and more apparent to both firms and individuals who have relations with India.

The second step in the development of the Empire services was taken in February 1931, when the direct service to Kisumu in British East Africa was opened, cutting down the journey to Kenya by an amount varying from one week to over three weeks according to the incidence of the steamer connections on the ordinary service. For this reason the air mail has appealed strongly to the British residents in East Africa, and they now send more than 60 per cent. of their letters to this country by air. From England the proportion of the letter mail for East Africa sent by air is about 45 per cent., although the weight of the air mail in each direction is roughly the same. This illustrates the fact, which the experience of other post offices confirms, that residents in the Colonies, where ordinary means of communication are of course less developed, are quicker than those in the Mother Country to appreciate and avail themselves of the advantages offered by the air mails.

In January 1932 the African service was extended to Rhodesia and South Africa, and although, owing to the incidence of the ordinary steamer service to Cape Town, the gain in time offered by the air service is smaller than in the case of East Africa, the use made of the air mail is increasing steadily. Imperial Airways will shortly reduce the length of the journey from eleven to nine days.

The Indian service has now been in operation for nearly

four years, the service to East Africa for two years, and to Capetown for twelve months. Nevertheless, in that short period these services have so developed that whereas in 1928 the weight of letters sent by air on Imperial Airways services was 16 tons, in 1932 the figure was 105 tons—an increase of over 500 per cent.—of which 90 tons were carried by the direct Empire services. The use made of the air services continues to grow steadily, and it is estimated that the total letter carryings for 1933 will have reached 150 tons or more.

Proposals for the establishment of an air service to Australia are now being discussed by the Air Ministry with the Governments of the countries on the route, and it is hoped that some time during the next twelve months this link in our air communications will be completed, reducing the time occupied in sending a letter to Australia and New Zealand to a fortnight.

The carriage of all first-class mail between the various points of the British Commonwealth by air is now well within the region of practical politics. It is probable that within the next few years an ordinary letter will be automatically routed by air to Australia for the same sum that is now charged for a letter across the Channel by surface transport. This will represent immense strides in speeding up Empire communications, and is an advance which has been urged by chambers of commerce on several occasions.

The Post Office decided that the new means of locomotion should prove itself for a period before entrusting His Majesty's mail to it as an accepted ordinary means of transport. The regularity of the air-mail services on the overseas routes is such that there can be no hesitation on that score, and it is certain that the business community will derive immense benefit from the acceleration of their mail.

Until this desirable result can be achieved, every means of popularizing air mail is being explored, and the latest innovation is a system of special rates for air-mail postcards, amounting to about half the charges on air-mail letters.

Personally I look forward to a day in the not-distant future when the normal transport of all mail overseas will be by air, except that specifically marked "Slow Mail", which may make its way by land and sea.

CHAPTER III

IMPERIAL AIRWAYS BEGINS

I

"THE safest airway in the world." That might well be the slogan of Imperial Airways to-day. And yet, astonishingly enough, it is a boast that is never heard from the men who have built up this amazing network of airways. Sit with them, talk with them, dine with them—conversation will concern itself with machines, mechanics, pilots and passengers. Safety is never talked about, for it is the very axiom and basis of the success of Imperial Airways.

Although the Company has been in existence about ten years and covered as many millions of miles, it is still regarded as something novel and new-fangled by those who have not yet realized the amazing revolution of our times that the internal combustion engine has created. To have carried more than a quarter of a million passengers and many thousands of tons of freight is both a real and romantic achievement.

To-day Imperial Airways maintains regular daily services between London and the principal cities of Western Europe, and weekly services between England, India and Burma and England and South Africa. Altogether these services cover 15,000 miles of routes.

The machines of Imperial Airways are establishing that prestige abroad which was once the pride of the British mercantile marine. British workmanship, British engines, British construction have now conquered the skies, and even the Continental nations admit our superiority in aeroplane building. On the eve of the last International Aero Show in Paris it was revealed that no fewer than six foreign governments have during the past two years ordered aeroplanes to the value of hundreds of thousands of pounds from one British firm alone.

Now to-day, flying more than 2,000,000 miles a year and

carrying annually over 60,000 passengers, our big British air-liners operate with a reliability of just on 100 per cent.

Fifteen aircraft were all Imperial Airways owned when it began flying. To-day its aeroplanes and flying-boats, comprising forty powerful multi-engined machines, make up a fleet of the largest and most luxurious aircraft in the world.

Since they began operations the aircraft of Imperial Airways have flown a total of over 11,000,000 miles, and have carried nearly 260,000 passengers.

As an epitome of fourteen years of air-transport progress, from 1919 to 1933, it may be said that during the all-important phase our British airways have afforded the amplest proof of their speed, reliability, and comfort. To-day air loads continue their rapid growth, recent increases in passenger traffic having in certain cases been from as much as 60 to 100 per cent.

The now extensive fleet of Imperial Airways is described later. But it may be stated here that the tests of the machines instituted by the Company are more severe than any other air-line in existence.

Imperial Airways, however, well justifies the title. It is, to-day, the strongest of all links in Empire communications. Communications, in fact, have become the real arteries of commerce and politics. The aeroplane, the overseas telephone, and the wireless stations have done more to stimulate Empire consciousness than all the speechifying, the discussions of tariffs, and newspaper leading articles could ever accomplish. Machines and men have displayed themselves. The pilot of an Imperial Airways machine is in every sense a flying ambassador. And that the political significance of this is not lost sight of is proved by the care with which these men are selected. Imperial Airways has as much pride in its personnel as in its machines. They are all British.

At a time when Empire politics contain much loose thinking it is possible to point with a certain amount of pride to the real links between the Mother Country and the Dominions that are being forged by a commercial company. In many ways Imperial Airways has taken the place of the old trading companies such as the East India Company and the British

IMPERIAL AIRWAYS BEGINS 61

South Africa Company. It was the East India Company and its adventurers—adventurers in the true sense—who bravely tackled the almost insuperable problems of India and eventually brought that complex country into the sphere of Empire politics. The British South Africa Company, with the urging genius of Rhodes, created Rhodesia. But the story of the building up of the Empire is the same in its beginnings—a handful of sailors, a lone explorer, a trifling expedition landing on unknown territory and creating an outpost.

Nowadays the adventurers descend from the skies. Instead of creating trading posts they create aerodromes. It is interesting to speculate upon the political importance of aerodromes in the future. Time was when nations jealously sought coaling stations for their fleets. Britain was particularly fortunate in its selection of ports, islands and rocks along the seaways of the world. And there have been occasions when these coaling stations of different nations have led to international complications. To-day Imperial Airways has founded aerodromes along our Empire air-routes which thereby assume increasing political importance and have sometimes necessitated delicate negotiations with foreign Governments.

But it is a characteristic of the air-minded peoples that they are broadly international. The airways of the world are now so inextricably linked that only a general international understanding is possible. Foreign planes flock to Croydon in increasing numbers, and British machines are seen increasingly on the Continent. The result is a fine, helpful spirit of internationalism, which is reflected in the way the ground staff of these aerodromes assist visiting planes. The lonely plane that comes out of the sky on to any aerodrome in the world is always sure of help and technical advice. The airmen are internationalized and practise real helpful internationalism.

Those record-breaking flights to the Cape and Australia by popular airmen would be impossible without the help of the ground staffs of the various aerodromes en route. These cleared places on the earth's surface are of the first importance to our record-breakers, and the chain of Imperial Airways stations has been utilized again and again. Those responsible for international conventions are now discussing the utilization

of aerodromes and rapidly developing a code of the air which will be as important as the code of the sea.

II

Who are the brains behind Imperial Airways? Who are the men who have made this gigantic organization, with its network of air lines stretching across the map of the world, so uniquely successful? Those men who formed the big companies at the time of Empire expansion, the East India and South Africa Companies, now rank with the great statesmen as figures of historic importance. It may well be that the men who have made an airway greater, more extensive, and with a finer record than any other in the world, will some day be worthy of the laurels of history.

One can, of course, point to the pilots of these air argosies as the true adventurers and pioneers of to-day. They brave all the elements, and in the long run the record of safety and efficiency must rest with them. Also with the airmen who never fly—the mechanics of the workshops, the testers, the men at the lathes, the whole army of overalled figures who flit about the giant machines and the engines when at rest, and whose oiled and greasy fingers explore the intricacies of those steel hearts that throb and roar majestically through the skies. It is not easy to forget these men, robots though they may appear. One's very life depends upon them and their skill as one flits away as a passenger from their scrutinizing eyes and careful hands.

But a gigantic business dealing with millions of pounds' worth of machines, merchandise, mails and, above all, the precious lives of passengers needs clever directing brains. It is no exaggeration to say that Imperial Airways possesses some of the best in the world, and its record of safety is unparalleled in the world of aviation. In this accepted transport of the future Britain cannot afford to be behind the rest of the world.

The presiding genius of to-day is Sir Eric Campbell Geddes, F.C., G.C.B., the chairman of the Company. He is a genial giant who can tackle a mountain of work with zest. He has



By courtesy of]

[Wide World Photos

SIR GEORGE BEHARRELL WELCOMES HOME SIR ERIC GEDDES FROM
SOUTH AFRICA

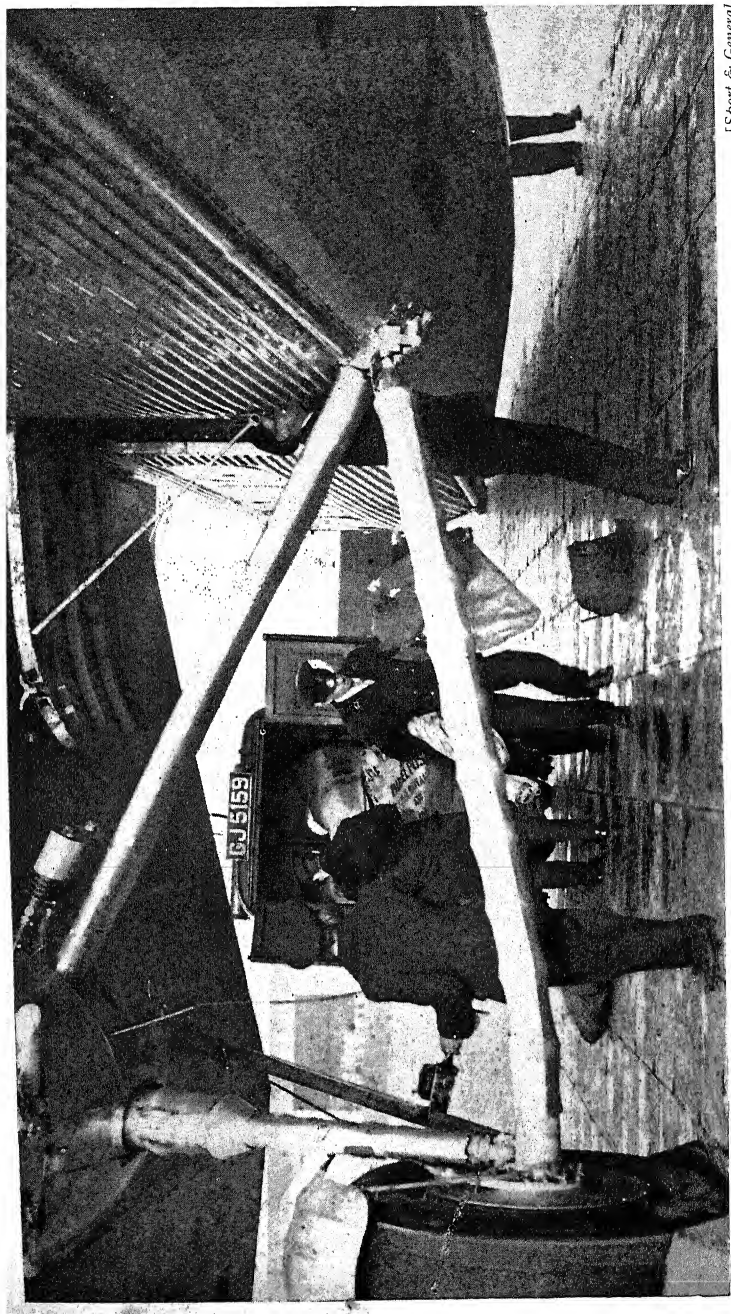


Photo by courtesy]

TAKING ABOARD THE CHRISTMAS AIR MAIL FOR SOUTH AFRICA

brought to Imperial Airways not only one of the best directing brains in Britain, but incidentally a wealth of experience and travel and business acumen which few men of his age possess.

Sir Eric admits that in his early days he was much more interested in football than in the career planned for him in the Royal Engineers. He went off to America at the age of seventeen, and stayed there till he was twenty-one, working as most men did in those adventurous days of going from job to job. In succession he was brakesman of a freight train, labourer in a steel foundry, on a logging job in Western Virginia and Kentucky, at a saw-mill in limber yards, and for a time on the Baltimore and Ohio railroad.

Railways began to interest him. The swiftest and best form of transport always attracted his keen attention. He went to India and spent five or six years working on the railways there. Eventually he returned to England and took a minor post on the North-Eastern Railway.

But his genius for organization brought him to the top during the Great War. He was one of the supermen who worked incessantly behind the scenes and helped towards the successful termination of that conflict. In fact, during that period he appears to have held almost every position except that of Prime Minister and Lord Chancellor. He was, in turn, a General and an Admiral, and one of the few men who has made a maiden speech from the Treasury Bench.

In 1915 Lord Kitchener asked him to help in the organization of the munitions supply. During that year he was in control of all rifles and machine-guns and the Royal Ordnance factories of Woolwich, Waltham and Enfield. Later he became Director-General of Transportation.

It was only natural that his amazing knowledge of transport should place him in the position of London's first Traffic Dictator. Later, when the Government of this country found itself spending in peace time as wildly as in war, he was asked to place his business knowledge at their disposal. It was a thankless and much abused job. But the results were magnificently right. His name will go down in history as chairman of the famous "Geddes Axe Committee" which recommended cuts of £100,000,000 in Government expenditure.

After that long and trying period in the service of the country, he went back into business. He has made as great a success of his business life as he did of his political career. Imperial Airways could not have secured a better chairman. But it is typical of his tiger-like capacity for work that he is also chairman of the Dunlop Rubber Company and about fifteen other large concerns.

To-day, he is fifty-seven, but looks younger. He has a square, determined jaw offset by a cherubic smile. He believes in fitness and is always in bed by ten and up at six-thirty. He swims every day, summer and winter, in a pool at his Sussex house, enjoys a game of tennis, and is never happier than when he is riding a horse over the lovely Sussex Downs.

Such is the zestful personality at the head of Imperial Airways. He is mainly responsible for the policy of the Company throughout its existence, and has never failed to achieve unanimous support of the Board on all questions. Sir Eric Geddes takes a keen personal interest in all matters affecting the Company, and flies along the Imperial Airways routes to acquaint himself with conditions at first hand.

Another most important figure in the organization of Imperial Airways is Sir George Beharrell, D.S.O. Here is another energetic man with a wealth of experience on transportation work. During the war he was, in fact, Assistant Director General of Transportation in France. He and Sir Eric Geddes are almost inseparable in their big-business matters, and not only are they found together with Imperial Airways, but also with the Dunlop Rubber Company, of which Sir George Beharrell is managing director.

A most energetic and dynamo-like brain is that of Mr. G. E. Woods Humphery, the general manager of Imperial Airways from its beginning, and now managing director. Here is a man who lives and works for Imperial Airways day in and day out. I have met and dined with him on several occasions, and always the talk has turned to the air, and in particular to Imperial Airways. A more charming man one could not wish to meet, and he possesses a fund of good stories which would enliven any discussion among experts of the air,

for at such discussions he has constantly to preside. And his capacity for work must be amazing, for I have never found him anything but urbane, optimistic and an insistent host.

Mr. Woods Humphery began his highly interesting career as an engineer. He served an apprenticeship in marine engineering and shipbuilding with Yarrow's, and subsequently studied railway locomotive practice. But the war found him an eager young man anxious to pioneer in the air. He served in the Royal Flying Corps and subsequently in the R.A.F.

There are many others in this little group of men who direct the activities of Imperial Airways of whom I would like to write. I have met most of them, and they all impress one with an almost awesome sense of efficiency. And efficiency is reflected in almost everything that is visible to the ordinary passenger along the air routes of Imperial Airways. That is of immense value.

I would have liked space to tell of Mr. H. L. Hall, the Chief Engineer of the Company. Much depends on this man who is the brains of those robot-like machines that wing through the clouds. Here again one finds in the Chief Engineer that ruthless insistence upon efficiency which can make the most easygoing mechanic into a careful and yet enthusiastic worker. During the war Mr. Hall was Chief Engineer of the Royal Aircraft Factory. He has a wide and varied experience in many branches of engineering. In particular, his knowledge of aircraft and aircraft engines is exhaustive and unique. Where the Company's interests are concerned he has a reputation in the aircraft trade of requiring an even higher standard than that of the Air Ministry Inspectors themselves.

Then there is the man who might be called Chief of all the Pilots. I have travelled and talked with him, I have sat beside him while he navigated a flying-boat with brilliant skill, and found him a bundle of adventure hidden by a very modest exterior. This is Major H. G. Brackley, D.S.O., M.C., known officially as Air Superintendent. He is an exceptional pilot and navigator of all types of aircraft, and is the final authority in connection with the flying tests of all new aircraft purchased by the Company.

His post of Air Superintendent originated, strangely

enough, with a strike of air pilots. When Imperial Airways was founded by the merging of four existing air companies, the pilots of these companies feared for the security of their positions. They expected that economies would drive many of them into unemployment.

It had been stated that the new Imperial Airways Company would begin flying operations on the then existing air routes on April 1, 1924. In the meantime the pilots had formed a union under the leadership of Colonel G. L. P. Henderson, and refused to fly until certain provisions in their proposed contracts had been modified.

This prevented all flying operations. But soon there were dissensions among the pilots, and Pilot Robertson was the first to break the strike. He flew a De Havilland 34 machine to Paris on April 26, 1924, in the worst possible weather. Incidentally this flight launched Imperial Airways in its career. On this flight Major K. M. Beaumont, D.S.O., afterwards the solicitor of the Company and a private pilot, was the only passenger. On account of the weather he found the trip an adventurous one. This being his first flight, he did not appreciate that the thunderstorms through which the aircraft flew and the bumps which threw him all over the cabin were exceptional.

From this beginning the other pilots soon followed. The remainder of the men on strike, with the exception of Colonel Henderson, but including Captain F. L. Barnard and Captain Hinchliffe, joined up with the new Company and resumed flying. It is remarkable that all three of these exceptionally fine pilots were afterwards killed, though none of them while flying for Imperial Airways. Colonel Henderson met disaster in a Junkers aircraft over Meopham, in Surrey; Captain Barnard was killed while testing a racing aircraft for the King's Cup Race, while Captain Hinchliffe, who had only one good eye, disappeared in attempting to fly the Atlantic with Miss Elsie Mackay.

It was in the course of this pilots' strike that the unassuming Major Brackley was pushed forward. The Company suggested that the pilots should submit to the Board their idea of an individual to represent them before the Board of Management.

IMPERIAL AIRWAYS BEGINS 67

Major Brackley was chosen for this post, and has occupied it ever since. Since then his remarkable flying skill and experience have been utilized all over the world where Imperial Airways penetrates. The last I heard of him was that he had successfully piloted the first Imperial Airways machine to Port Darwin in Australia. He had blazed a new trail for the Company.

III

The creation of Imperial Airways was the inevitable step in the development of Great Britain as an aeronautical nation of consequence.

Prior to 1924, British commercial air transport was operated by Daimler Airways between London and Berlin; by Handley-Page, Ltd., between London and Paris; by the Instone Air Line between London and Cologne; and by the British Marine Air Navigation Company between Southampton and the Channel Islands.

Although these companies were performing excellent pioneer work there was a certain amount of overlapping, and the question of subsidies for mail services naturally aroused fierce competition. To find some method of co-ordination, therefore, the Hambling Committee was formed and investigated the situation.

Eventually this Hambling Committee recommended that all four concerns should be consolidated into one national company in receipt of a single subsidy from the British Government. This recommendation was adopted, and we find Imperial Airways being registered on March 31, 1924.

The new company acquired the interests of the four existing air concerns, which were represented on the new Board by Colonel Frank Searle (Daimler Airways Managing Director, who retired not long afterwards); Sir Samuel Instone (Instone Air Line); Colonel Barrett-Lennard (Handley-Page, Ltd.), and Mr. Hubert Scott-Paine (British Marine Air Navigation Company).

But before we follow the fortunes of this great and growing concern, we ought in fairness to the early cross-Channel pioneers to say something of those adventurous times. It does not seem very many years ago that flying the Channel was considered an extremely hazardous affair. One can recall the excitement

over the competing adventurers for the *Daily Mail's* offer of £1000 in 1909 for the first man to fly the Channel.

It would be impossible to forget, also, the splendid impetus given to aviation in those days by Lord Northcliffe and the *Daily Mail*. It is, perhaps, not generally known that the *Daily Mail* has given prizes for aviation feats totalling £57,180, the four largest being of £10,000 each. One of the first was awarded in 1919 to Captain Sir John Alcock and his comrade Sir Arthur Whitten Brown for the first transatlantic flight. The fourth was won by Miss Amy Johnson, now Mrs. J. A. Mollison, for her remarkable lone flight from England to Australia.

But in those early days the Channel was not "The Ditch" which the modern air-liner pilot contemplates for a few moments only on his swift and regular progress between Croydon and Le Bourget. The war in France certainly made the Channel familiar to pilots of the R.A.F. taking relief machines out to the British air bases. But it was not until August 25, 1919, that the first commercial aircraft instituting a regular London-Paris service set off. This machine belonged to Aircraft Transport and Travel, Ltd.

The British Handley-Page Transport, Ltd., and the French Compagnie Messageries Aériennes were quick to follow, and by January 1, 1920, there were three British and two French companies operating on a regular time-table across the Channel. These operations were nearly all carried out by military aircraft or by military aircraft modified to carry passengers in some degree of comfort.

Of the return flight from Paris to London of the first regular commercial machine, Mr. Harry Harper, in his excellent book *Romance of a Modern Airway*, has a thrilling description. The pilot was Lieutenant H. Shaw. He had two passengers, and, despite the bad-weather reports, he decided to attempt the crossing of the Channel.

"Hardly had he left the ground, however, plunging among the scudding clouds, when conditions all along the route grew decidedly worse", writes Mr. Harper. "In London there was astonishment when the news came through that the machine from Paris had started. It seemed almost like madness in view of the execrable weather prevailing. . . .

"In the Channel, as the machine approached the French coast, the wind rose in gusts of such hurricane force that at one coastal station a gust with a strength of just over 100 miles an hour was recorded. We all thought that the airman would decide to abandon his flight at the French coast, and not attempt the Channel crossing. But, as Lieut. Shaw said afterwards, it seemed to him as if he had burned his boats once he had left the ground. The weather grew so much worse, in fact, that it appeared to him that he ran less risk by struggling on through the air than he would have done had he tried to get his machine down somewhere in conditions of such abnormally bad visibility.

"At any rate, we in London heard with amazement that he had actually left the French coast for the aerial crossing of the Channel. After that for a time there was no news, and there were some anxious faces round the 'phone. The weather reports from the English side seemed to get worse steadily, and the visibility was almost nil, when suddenly out of the mist and rain the gale-driven aeroplane appeared low over the coastal station on this side and vanished into the murk inland. The news of its arrival over the English coast was quickly flashed through to London, and there were many sighs of relief now that the dangers of the Channel crossing had been survived. Lieut. Shaw's battle up to London, against tremendous wind gusts which almost caused him to lose control of his machine, was one of the finest feats of airmanship ever performed. More than once his biplane got into spins and dives which threatened to end in an uncontrolled crash; but each time the pilot, although exhausted by his ceaseless struggle at the controls, managed to get the machine back again upon an even keel. Once visibility was so bad that, almost before he was aware of the fact, he found himself flying so low up a valley that his wing-tips were nearly touching the trees on either side.

"Presently, when his strength was almost exhausted, he found himself near the Hounslow aerodrome, and just managed to get his machine safely to earth. But he hardly had strength to climb from his cockpit, the sheer physical strain, apart from the mental stress, having been acute.

"There was an amusing as well as an heroic side to this

BY AIR

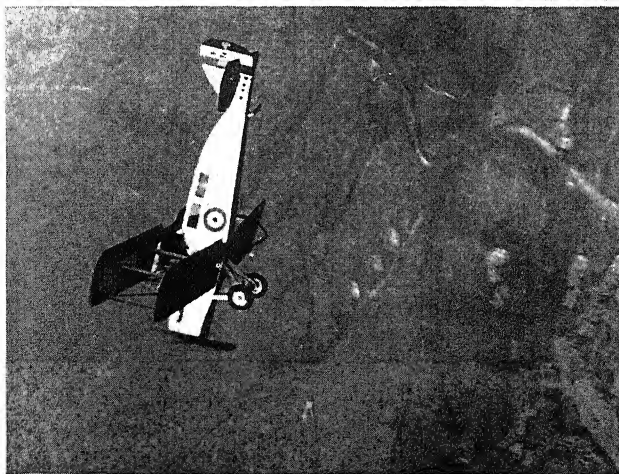
adventure. When the passengers' cabin was opened it was expected that the two occupants would be on the point of collapse. But that was far indeed from being the case. They were, in fact, very pleased with themselves, and declared that they had thoroughly enjoyed the experience. No idea of the perils of that journey had entered their minds, and once or twice, when the aeroplane was doing extraordinary things in the air, they had not been in the least perturbed, imagining that the pilot was carrying out some special "aerobatics" for their particular amusement. It was of such stuff that pioneer passengers, as well as pioneer pilots, were made!"

How different is air travel across the Channel to-day by Imperial Airways! It is, indeed, the most luxurious form of travel to the Continent, and in cost compares favourably with train and boat services, whereas in time there is no comparison at all. For women, particularly, air travel to Paris is a great boon. There is no need to garb themselves in weather-defying clothes. A woman may step into a 'plane at Croydon in an afternoon frock and find herself as fresh and uncreased taking tea in a Paris hotel two and a half hours later.

And the giant machines now engaged upon the London-Paris route are the biggest and best commercial aircraft in the world. They are, in every sense of the word, air-liners. Their passage through the air is smooth, the roar of the four engines has been reduced to a pleasant hum, and conversation in the 'plane is easier than in an express train.

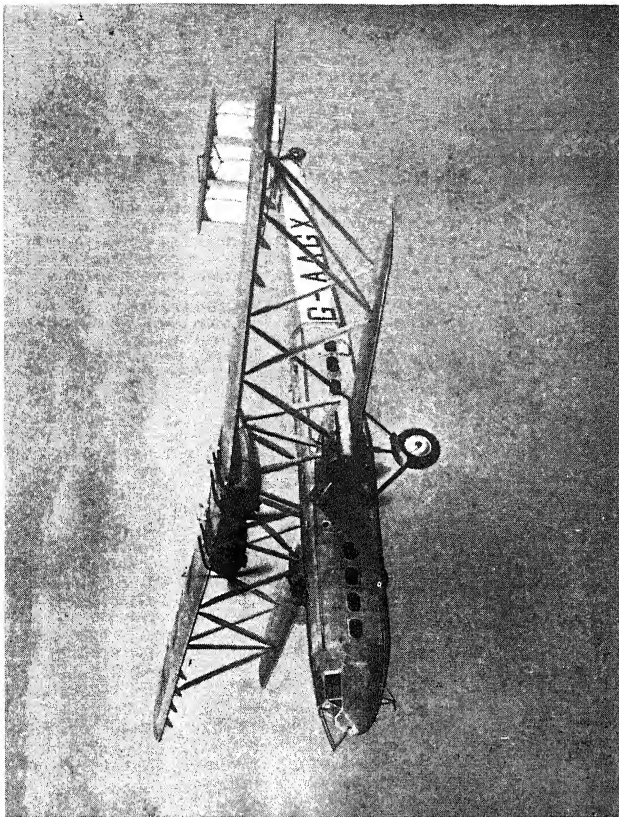
The last time I flew to Paris was in *Hengist*, the Handley-Page Silver Wing 'plane with its four Bristol Jupiter engines. Captain Jones was the pilot, and I found the crossing to Paris luxurious. The serving of luncheon by stewards, the comfortable seating, the casual, almost bored air of the travellers, revealed that the original thrill of air travel is disappearing. It is, indeed, becoming matter-of-fact.

But the drama of departure by 'plane from Croydon always gives me a thrill. Those first few minutes of the take-off never lose their excitement. The slow taxi-ing, the opening of the engines to their full extent, the bull-like rush of the machine across the ground, and then the lift with the huge wheels revolving uselessly in the air. One has a last glimpse of Croydon and



Photos by courtesy]

LONDON-PARIS ROUTE 1019
THE FIRST PASSENGER PLANE CARRIED
A PILOT AND TWO PASSENGERS AT
20 GUINEAS AHEAD



Imperial Airways

PLANE OF THE "HANNIBAL" CLASS (BRISTOL JUPITER ENGINES)
EMPLOYED ON THE INDIAN ROUTE, CARRYING A CREW OF FOUR
AND TWENTY-FOUR PASSENGERS

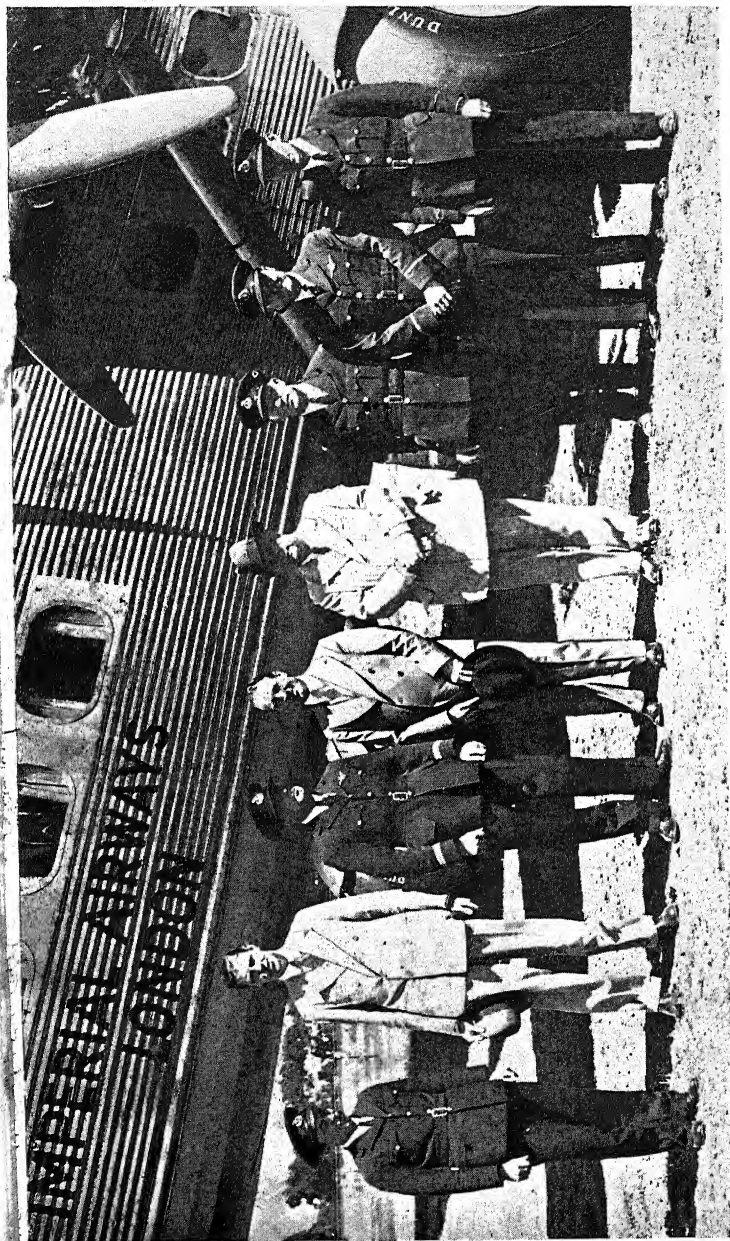


Photo by courtesy]

[Imperial Airways

SIR ERIC GEDDES ARRIVES AT CAPETOWN ON TOUR OF INSPECTION

Reading from left to right: (1), Steward; (2), Mr. Reay Geddes; (3), Capt. Powell; (4), Mr. Woods Humphery; (5), Sir Eric Geddes; (6), Flight-Engineer; (7), First Officer Messenger; (8), Wireless

IMPERIAL AIRWAYS BEGINS 71

the hangars, and the ant-like specks of spectators gazing upward.

The flight to Paris is invariably uneventful. The clear sunlit landscape of Kent gives place to the soft, misty blue of the Channel. It is like flying through blue gauze. Except for the ships below tracing their pathway like models on glass with the wake frosted, the illusion of being in boundless ether would be complete.

During the crossing of the Channel on my last trip I noticed that the pilot, Captain Jones, left the navigation to his First Officer, and walked down the length of the two cabins. This is now the usual practice, and gives added confidence to those passengers who are making their first flight.

The coast of France appears. The difference between the French and English landscape from the air is soon apparent. The English roads are winding, the fields smaller, the farmhouses more compact. But there is a spaciousness about the French landscape. The fields, even just the other side of the Channel, are bigger. The farmhouses are more scattered. And the twisting roads of England are replaced by the straight, military, poplar-lined roads.

For half an hour on this particular flight we flew over a big bank of cloud. I glimpsed a machine in the distance flying among the white peaks. Then we dived abruptly into the swirling mist. Below us was Le Bourget, a little desolate and uninviting beneath the clouds.

Ten minutes later I was in a taxi, rushing to Paris. That drive was much more exciting and nerve-racking than the whole flight between Croydon and Le Bourget.

With directional wireless it is now possible for a pilot to take his machine up from Croydon above the clouds and nobody glimpse even the Channel or land until, by command of that same wireless, the machine dives through the clouds and finds itself at Le Bourget. It has to be exceptionally bad weather to stop or even delay this regular service of Imperial Airways.

Meanwhile, in striking evidence of the growing air-mindedness of those who make Continental crossings, there is the fact that the number of air passengers between London and Paris, which 13 years ago was never higher than 30 passengers a week, rose in a recent summer to more than 1300 a week.

I ought to mention, too, the regular service which Imperial Airways has instituted between Croydon and Le Touquet. There was a danger, not long ago, of this fashionable Channel resort, its excellent Casino and wonderful golf-links, being neglected, if not abandoned. The syndicate that financed Le Touquet were in despair.

Then Imperial Airways established a service. Now, for a few pounds, the Londoner is carried across the Channel, given lunch at Le Touquet, has tea and maybe a mild flutter in the Casino, and a flight back to Croydon in the evening with dinner in the plane. It is the cheapest and pleasantest day excursion in the air that I know. And the effect upon Le Touquet has been magical. Hotel proprietors have benefited, and last summer Le Touquet had the best season for many a long year.

IV

But in my enthusiasm for Channel crossings by air I am neglecting the remarkable development of Imperial Airways from the early beginnings of 1924.

The aircraft taken over by the then newly constituted company were, compared with present standards, very inefficient. They consisted of single-engined De Havilland 34's, D.H.50's, Vickers Vulcans, and Handley-Page twin-engined aircraft.

At the start, April 1924, the total paying load capacity of the Company's fleet was 23,000 lbs., as compared with 119,200 lbs. in 1932. The total passenger capacity was 112 as compared with 575 in 1932, and the total mileage operated by the Company's regular services was 1760 miles as compared with about 15,000 miles in 1933. In 1924 the engines were all water-cooled—Napier's, Rolls-Royce and A.D.C. In 1932 they were practically all air-cooled radials—Bristols and Armstrongs.

I realize that to some readers these may appear just statistics, but to anyone with a real knowledge of aviation they do emphasize the astonishing progress of Imperial Airways within a few years.

Consider that thirteen years ago the first small machine on the Paris route carried a pilot and two passengers. Then a year

IMPERIAL AIRWAYS BEGINS 73

later came machines which carried a pilot and eight passengers. Following this came aircraft with two pilots and from nine to fourteen passengers. 1925 saw the introduction by Imperial Airways of a fleet of big three-engined air liners, which were the first of their kind, and each of which carried a crew of three together with 19 passengers.

It was in 1932 that Imperial Airways introduced the 13-ton four-engined machines which, cruising at 105 miles an hour, carry a crew of four and have accommodation for 38 passengers. Then came the speedy monoplanes of the *Atalanta* type for use on the Africa and Australian routes, of which I had a good deal of experience, flying in one, *Artemis*, to the Cape.

These *Atalanta* type aircraft, built by Armstrong Whitworth, are four-engined monoplanes capable of cruising at 120 miles an hour when carrying two tons of paying load. They are capable of a maximum speed of 150 miles an hour.

In its flying-boat service, too, Imperial Airways has led in construction and dependability. In 1924, when Imperial Airways began operations, the flying-boats then available carried six passengers at 85 miles an hour. By 1926 machines had been designed and built which carried 12 passengers at 90 miles an hour.

Then in 1930 came the well-known three-engined "Calcutta" flying-boats for Mediterranean sections of the air mail route to India, which carry 15 passengers and a crew of four, their total horse-power being 1500. And now to-day, on Mediterranean stages of the India and Africa air lines, Imperial Airways is operating the four-engined "Scipio" flying-boats, developing 2200 horse-power and carrying a crew of four, together with 16 passengers and a ton of mails and freight.

Flying over the sea calls for different technique than that of flying over land. There is something much more nautical about these pilots of the flying-boats than about the pilots of the land machines. But there are pilots who combine the technique of both perfectly. One of those men is Major Brackley, the Air Superintendent.

There is one pilot, Dismore, who in the early days of Imperial Airways had the distinction of bringing down a

Handley-Page aircraft full of passengers in the Channel in rough weather after failure of one of the two engines. In spite of the land undercarriage he made a perfect descent, the aircraft remained afloat, and within a comparatively short time everyone was rescued without so much as a single person getting his feet wet.

A catastrophe which ended very differently occurred near Genoa when one of the early "Calcutta" flying-boats was forced down on the sea in terrible weather. The pilot landed safely, and the aircraft rode out the storm for hours. It was eventually taken in tow by an Italian boat, but it was dragged under water and lost owing to the storm and darkness preventing the towing vessel from following the instructions of the crew of the flying-boat.

Altogether, Imperial Airways has a greater record of safety than any other air-line in the world. By 1933 the total length of its air-routes had increased from 1000 miles (all within Western Europe) to more than 15,000, serving three continents and crossing no fewer than nineteen countries.

And in the course of this ten million miles of regular flying enterprise there have been but five accidents involving injury to passengers.

A very high standard of efficiency has been reached. As much as 100 per cent. regularity in flying to a published timetable is claimed for certain European air liners operating during summer weather, and 100 per cent. regularity for the British service between Cairo and India. Three quarters of the failures to maintain perfect regularity are due to weather and failure of power-plant, 66 per cent. being due to weather, and 34 per cent. to mechanical defects throughout the year. This high standard of regularity and safety in British air transport was obtained very largely through the skill and determination of the pilots. A notable proof of the efficiency and reliability of the British air service is demonstrated by the decrease in insurance rates. Moreover, the inspection and maintenance system carried out by Imperial Airways is regarded by experts as one of the most efficient in the world.

It is a record of which Imperial Airways is rightly proud.

And what of the finance of flying? What is the extent of these mysterious, huge subsidies of which the taxpayer hears and is apt to question?

Let it be said at once that British air transport is operating more economically and with a smaller cost to the taxpayer than in any other country. Some recent figures showed that each British commercial aircraft on regular transport services was flying more than double the average miles per year flown by American and German, and more than three times the average flown by French commercial machines. They also indicated that the average load carried by each commercial machine was ten times greater than the French, six times greater than American, and about two and a half times greater than German commercial aircraft. This obviously indicates a higher standard of economic operation.

But consider the civil aviation votes of the great nations. The United States easily heads the list with a vote of £2,480,814 in 1931, the latest available figures. And if we include the amounts provided for payments to air-mail contractors by the Post Office, the American figure reaches the colossal sum of £5,548,705.

Then comes Germany with a civil aviation vote of £2,119,475, a slight decrease upon the 1930 figures.

France has a total civil aviation vote of £2,037,883.

Italy voted £798,183.

Great Britain, including Empire services, had a total civil aviation vote for the same year of £678,400.

It will thus be seen that Imperial Airways, which receives practically the whole of the British subsidy, has to compete against foreign companies much more heavily subsidized.

When Imperial Airways was first brought into being in March 1924 it was with a guarantee of a total subsidy of £1,000,000 spread over a period of ten years on a tapering scale, for regular flying carried out within Europe, the contract with the Government permitting liberty of action as to the services actually operated.

At the beginning the subsidy was paid according to the

mileage flown on the regular routes, irrespective of the type of aircraft employed. As this method of payment held out no inducement to use larger and more economical aircraft, it was modified in December 1925 so that "horse-power miles" instead of "machine miles" became the basis of payment.

In order to earn the maximum subsidy the Company is required to fly a minimum of 425,000,000 horse-power miles per annum. The fruit of this alteration was that the Company renewed its fleet with the most advanced commercial aircraft obtainable, and is now operating most efficiently. It is clear, too, in the light of experience, that the future of British commercial air transport depends upon the development of the main trunk lines throughout the British Empire rather than in the operation of internal and short-distance Continental routes.

I mentioned that the total civil aviation vote of Great Britain in 1931 was £678,400. Of this, Imperial Airways received £520,000. And again, of this £520,000, no less than £155,000 were contributions from Dominion and Colonial Governments towards the subsidization of Imperial Airways' service to South Africa.

With the funds at its disposal and the world air routes that they cover, Imperial Airways performs wonders. Here and there in the United States, in Australia, and elsewhere air companies operating on a commercial basis have been able to show profits without Government assistance. But these instances are sporadic and conditioned upon specially favourable routes where the density of traffic or the saving of time over other means of transport set up special circumstances, or more usually because Air Mail contracts have been secured at rates greater than the revenue received by the contracting Postal Administrations. In other words, although no direct subsidy *qua* subsidy is paid, the Air Mail payments are in fact Governmental financial assistance. Generally flying companies at present cannot be operated without subsidies, of some kind, and Imperial Airways can claim to have set the example of a fine record of economy combined with efficiency.

Recently there has been much talk and discussion of proposals for the internationalizing of all civil aircraft. It began at Geneva and has been seriously discussed by responsible

statesmen in various countries. These suggestions are apparently based on the fear that civil aircraft might be converted in time of war.

It is necessary to dismiss these fears as fantastic and, at the same time, point out the danger of allowing British air communications throughout the Empire to come under any international control, from Geneva or elsewhere. I cannot do better than quote the trenchant arguments of Sir Eric Geddes, against this internationalization scheme. The article appeared in the *Daily Mail*, November 7, 1932.

"Imperial Airways employs only thirty-two pilots, which, so far as aerial warfare is concerned, is a negligible number", he wrote. "If anyone were crazy enough to use them as fighting machines our air liners would be so vulnerable in war-time that one might well say that their military value was even less than the fighting value of an Atlantic liner in naval warfare. A single-seater scout would destroy the first just as a submarine would sink the latter.

"It might be argued that they could be used for troop carrying. That is so, if they could be collected and operated with an army; but there again the total number of troops which could be transported in the air is negligible, when we consider any type of warfare other than military policing of desert areas and similar duties. The mere aerial escort of these liners would be a tremendous task for any air force to undertake in war.

"There seems no more reason, so far as I can see, why one should place civil aircraft and civil air operation under international control as part of a disarmament plan than that telephones, shot-guns, and wireless sets, or, indeed, the Mercantile Marine, should also be under international control.

"There seem to me to be other ways in which the menace of creating a force of military aircraft under the cloak of civil aviation could be dealt with. In the first place, an international register ensuring complete publication of the number and design of civil aircraft in contracting countries should be maintained and published. In the second place, agreement should be reached that every air-operating company should receive a subsidy only in a form which makes the commercial operation and development of their fleet the interest of the

shareholders and managers, as is the case with Imperial Airways, and that no subsidy should be permissible based upon pilots employed, machines maintained in service, or machine-miles flown.

"On the question of design, I can see no more fatal action to our fine aircraft industry than placing the design of civil aircraft under international control; and of course, if it did not apply to all nations, it would mean the practical dominance of the aircraft industry of the world by any uncontrolled industrial country.

"We wish to develop our Empire on peaceful lines; we wish to come closer to our kinsmen overseas, and, however much we long for peaceful relations among the nations of Europe, I cannot think that this country or the great dominions and territories overseas would approve any international board of control for our intercommunications.

"The following figures illustrate the civil air activities of the four great European Powers, and one cannot but wonder what proportionate representation we would secure on such a board.

	Aircraft employed in regular air transport	Average pay load per aircraft	Number of pilots em- ployed in regular air transport	Approximate weekly scheduled mileage
France ..	269	1,380 lb.	135	109,000
Germany ..	177	1,849 lb.	160	299,000
Italy ..	77	1,836 lb.	61	60,600
Gt. Britain ..	32	4,858 lb.	32	35,000

"In any event, let the country and the Empire know the facts before we are committed even to the extent of suggesting such a scheme for consideration."

CHAPTER IV

THE ATLANTIC ROUTE

I

THE spanning of the Atlantic Ocean by air in the near future is the great ambition of aviation. It will come. It must come. What the Mediterranean was to the Old World, the Atlantic is to-day.

The biggest and most powerful of liners plough through the Atlantic. Over its water steam the biggest war fleets ever seen. Thousands of tramp steamers, carrying food and material from the Old and New Worlds, roll through its mighty troughs. Hundreds of thousands of men and women sail between Europe and America each year.

It is essential that the Atlantic Ocean be conquered by the aeroplane. Actually, man to-day can claim that the air conquest of the Atlantic is complete. And now big business, in the shape of the big aviation companies, are battling for the control of the air routes across this most treacherous of all the seven seas.

"Within the next two or three years Imperial Airways will be able to organize a transatlantic mail service across the North Atlantic," said Sir Eric Geddes, Chairman of Imperial Airways, recently. The exploration work in Greenland and the Arctic Circle by the late Mr. G. H. Watkins and his companions has already prepared the basis for an air route from England to Canada.

In the South Atlantic between Africa and South America several flying records have been established. Our own aviator, Mollison, holds the record flight for this route, and it is Mollison again who holds the record of being the first man to fly alone across the Atlantic from east to west.

German fliers are already at work establishing a regular air route across the South Atlantic. And they have gone beyond the imagination of film producers by placing a supply ship in

the middle of the South Atlantic as a help to their fliers in Luft Hanſa machines.

The French, too, who have hitherto worked this route by planes from Paris to Dakar in West Africa, then by fast steamships to South America, are also planning a regular air service across the South Atlantic. The distance from Dakar in West Africa to Natal in South America is nearly 2000 miles.

There have been several spectacular lone flights by aviators. There have also been several spectacular big flights. Airships and giant seaplanes, squadrons of planes and now supply ships, have all contributed to this conquest of the Atlantic.

With these modern Atlantic flights in progress we are apt to forget the early pioneers who flew over this tempestuous ocean. It was only sixteen years after the first real successful flight by a man in a machine heavier than air that the great adventure of flying the Atlantic was attempted.

The first non-stop flight from America to Europe was begun on June 14, 1919. Captain Alcock and Lieutenant Brown (both were later knighted) left St. John's, Newfoundland, in a Vickers-Vimy-Rolls biplane and landed at Clifton, Galway, Ireland, the next morning after a flight of sixteen hours. In spite of bad weather during the flight, an average speed of 120 miles an hour was maintained. This crossing won for the fortunate men the *Daily Mail* prize of £10,000 for the first successful attempt to span the Atlantic by aeroplane. It must be remembered that in 1919 aeroplane engines were nothing like so reliable as they are in this year of grace, a fact which adds greatly to the credit of Alcock and Brown's achievement.

Nearly a month before this flight Harry Hawker and Lieutenant Commander Grieve had made their spectacular attempt to get across. As with most failures, the story of it makes more entertaining reading than it would have done had they succeeded.

Hawker and Grieve, in a Sopwith 360 h.p. biplane, took off from treacherous ground near St. John's on May 18, and as soon as they were over the sea dropped, by a patent mechanism, the under-carriage, thereby lessening the load and increasing their flying speed by seven miles an hour. The loss of the under-

carriage meant, of course, that the landing would be a delicate business at best, but the risk was worth it for the advantage it gave them while over the Atlantic. They carried a light boat, paddles, and an air-bag to use in case of a forced descent in the sea. The weather was bad, but the two fliers, getting tired of waiting for favourable conditions, decided on a sort of "do or die" dash before their rivals beat them at the goal. An American seaplane had already reached the Azores on its way across to Portugal.

They left St. John's at 3.15 p.m., which was 6.48 p.m. British summer time, and flew eastward without mishap until midnight, when the water-cooling system began to give trouble, the temperature of the water approaching boiling-point. They tried everything they could to keep the motor from getting too hot, and passed through a night of terrible anxiety. On one occasion Hawker dived the 'plane a thousand feet with the engine shut off, and found to his horror that the motor would not start again. The Atlantic was rushing up to them, and they had given up hope, when, within ten feet of the waves, the engine picked up with a roar—at that moment the sweetest sound in the world to those two men. But the water in the radiator continued to evaporate, and it became obvious that they could never get across. So Hawker steered a zigzag course, looking out for a ship. At eight in the morning a small tramp steamer, which turned out to be the *Mary*, a Danish ship, was spied, and the biplane flew toward her and landed close by in a very rough sea. The machine started to break up immediately with the battering it received from the seas, which were running so high that it was an hour and a half before a boat could get to them despite the short distance between the steamer and the 'plane. The *Mary* was without wireless, and it was not until a week after that the world got news of the lost fliers. Everyone had given up hope, when the little ship, approaching the Scottish coast, signalled that she had Hawker and Grieve on board. They had flown 1050 miles when they were picked up.

There followed eight years of silence after these achievements. Then came the most remarkable achievement of all—the lone flight of Charles Lindbergh on May 20 and 21, 1927. As an example of sheer courage, it has never been surpassed.

Lindbergh flew alone, he had no wireless, his 'plane was single-engined, and there were no ships stationed on the course to render help should he be forced down. The distance he flew from New York to Paris was 3610 miles, and he sat alone without sleep and unable to leave the controls for a moment from eight o'clock in the morning till ten o'clock in the evening of the next day ! During that time Lindbergh had taken half a glass of water, a little coffee, and a sandwich. He never felt sleepy during the trip, though the night before he left he had had no sleep at all.

It is, and perhaps will be for all time, the greatest flying feat ever performed. He flew on a dead-reckoning course, and staked his life on the reliability of his single engine, a Wright "Whirlwind" radial type. For a thousand miles he flew through rainstorms, and saw neither land nor a ship for twenty-four hours. His course was from New York to Cape Cod, Nova Scotia, Newfoundland, then to Cape Valentia, Ireland, Cornwall, Cherbourg and Paris. Sometimes he was at 10,000 feet and sometimes skimming a few feet above the waves.

His 'plane, *The Spirit of St. Louis*, was so heavy with the 451 gallons of petrol in its tanks that it narrowly missed crashing when at the take-off it just cleared a telephone line at the edge of Roosevelt Flying Field. This was the only dangerous moment of the whole flight, for, save for bad weather in patches, Lindbergh had no trouble at all. The first indication of Europe was a small fishing fleet which he passed over about four o'clock in the afternoon of the second day. Then he recognized the contour of the Irish coast, which appeared ahead, and an hour or so later he was flying over the rolling hills of Cornwall. He passed over Cherbourg at sunset, and when he landed at Le Bourget at ten o'clock all Paris went mad with excitement.

The lone flyer—"The Flying Fool" as some people called him—had come. He had been sitting at the controls for over thirty hours without rest. No wonder he was fêted abroad and at home, for he had achieved something which seized the imagination of men.

On his way home Lindbergh paid a visit to the House of Commons, and many of us forgathered with him on the Terrace ; his modesty and charming personality endeared him to all Members of Parliament whom he met.

That same year witnessed three additional crossings of the Atlantic by 'plane and a number of tragic failures. There was that double venture of Chamberlin and Levine, who successfully crossed the Atlantic and came down in Germany near the Hartz Mountains. Their flight, only two weeks after that of Lindbergh's, was the longest distance achieved by Atlantic fliers for some time.

But the most desperate ventures were those attempts, chiefly by English fliers, to fly from east to west. The prevailing wind is in the opposite direction, and the fliers who took off from Britain in those early days were attempting something that seemed suspiciously suicidal. Three aeroplanes were lost in trying to cross the Atlantic Ocean from east to west before the *Bremen* was fitted out for this same flight.

Two Germans and an Irishman were to be in charge of this fourth attempt to fly the Atlantic westwards. The men were Captain Hermann Koehl, Baron Gunther von Hunefeld, and Commandant James Fitzmaurice. Their machine, the *Bremen*, was a Junker monoplane, built of duralumin. It had been specially constructed for this Atlantic flight. The weight problem had been settled by the men agreeing to fly without wireless apparatus, lifebelts or collapsible boat. This gave them more room for petrol.

The *Bremen* left Baldonnell aerodrome, on the outskirts of Dublin, on June 12, 1928. The monoplane was sailing the clouds under two flags—the black, red, and white of Germany, and the green, white, and gold of the Irish Free State. Very soon they left the Irish coast behind them and flew into the Atlantic. They had sunshine and a calm sea beneath.

But with the darkness came strong hard winds, followed by a terrific blizzard. Thick layers of ice formed on the wings of the 'plane. Like a helpless bird the *Bremen* was tossed about from one storm to another. Then the lights over the instruments in the 'plane failed. In pitch darkness, bumping about in the winds, the machine drove on. One of the men worked desperately with a flashlamp trying to mend the lighting system.

While they were flying "blind" in this fashion they were unaware that the wind was carrying them out of their course.

When at last the lights were repaired and the instruments shone again in the darkness they found that they had flown out of their course four hundred miles north.

At long last daylight came, and the aviators worked out their position again. They found that they were far from their charted course. The only possible thing was to keep the nose of the machine westwards. They flew on, only to find themselves entering that fog-and-storm area of the Newfoundland Banks.

Petrol was getting low. They realized but too vividly that they could never reach New York, their declared goal. In fact, it was doubtful whether they could reach land at the other side of the Atlantic with the petrol that remained in their tanks. They flew on through blinding, swirling mist.

Suddenly through a break in the clouds the fliers saw a lighthouse on an island. It was the first glimpse of land they had seen for many long hours. And with almost empty tanks they decided to come down. They chose what seemed to be a frozen lake in the island on which to land. Down they swooped.

As the 'plane landed the ice cracked. The machine nosed over. But the fliers were safe. The only mishaps, after thirty-four hours spent in crossing 2000 miles of sea, were a broken chassis and a bent propeller. The fliers themselves were exhausted, but struggled towards the lighthouse. There they were greeted warmly by the keeper and some fishermen and a welcome meal prepared for them. The fliers were told that they had landed on Greenly Island, in the Straits of Belle Isle. Only seven families existed on this desolate strip of land.

As they were eating the meal provided from the scanty stores, the lighthouse-keeper sent word of the landing to the Point Amour wireless station, across the Straits on the mainland. The news was broadcast. Three days later rescue 'planes arrived for the relief of the stranded men.

The *Bremen's* engines were found to have suffered from exposure. Moreover, there was practically no chance of a good take-off from the little island. It was decided, therefore, that the fliers should go on to New York in the Ford relief 'plane which had been placed at their disposal.

When they reached New York, a splendid reception was given them. It was indeed a pioneer flight of triumph. To-day

the *Bremen* hangs in the Grand Central Station in New York City. It was the first plane to make the non-stop flight from east to west across the Atlantic.

But very soon the record-breakers were at work over the Atlantic. The most astonishing of all long-distance flights, and one that held the world's record for some years before the Royal Air Force fliers, Commander Gayford and Lieutenant Nicholetts, managed to break it, was the non-stop flight from New York to Istanbul, Turkey.

This was accomplished by Russell Boardman and John Polando when they stepped out of their plane, *Cape Cod*, at the point where Asia meets Europe, on July 30, 1931.

"The hardest part of the trip was over the Alps," one of the men said. "And while crossing the Atlantic, only once could we see the water below. This was at Newfoundland. Fogs hid the ocean from view all the rest of the time."

"We took turns piloting," the fliers explained. "While one was at the controls, the other slept for short periods of about half an hour at a time. As for the forty-nine hours we spent in the air—we could have made better time, had it not been for the fogs over France." This long-distance record was assisted by favourable Atlantic winds.

The ocean flights continued. These lone pioneers unhesitatingly showed their contempt for the restless and treacherous Atlantic. Then came the first woman to cross the ocean, Miss Amelia Earheart. On May 21, 1932, Mrs. Putnam, to give her her married name, startled the aeronautical world by her flight from Harbour Grace, Newfoundland, to Culmore, Ireland, flying solo. She made the hop in her Lockheed Vega, fitted with a 500 horse-power Wasp engine. Incidentally, by crossing the North Atlantic in less than fourteen hours, she established a new speed record.

Then came the biggest of all machines to cross the Atlantic—the *Dornier-DOX*. Built in 1929, and with a capacity for about 100 passengers, it was believed that this giant flying boat was the obvious future transport across the Atlantic. Her designers point out that the likelihood of breakdown is reduced by the fact that she depends upon twelve engines. But twelve engines demand a huge supply of fuel, and 100

passengers demand food and baggage accommodation which would be a serious problem for regular Atlantic flying.

On attempting her first flight across the Atlantic, from east to west, the *Dornier-DOX* was somewhat hindered by storms. She reached New York safely enough, however, and the return flight to Europe was in the nature of a new record. Captain Friedrich Christiansen piloted her, and, with 16 passengers aboard, the flight from New York to Harbour Grace, thence to the Azores and on to Vigo, Spain, was only a matter of hours.

The westward flight of this giant seaplane taught the air conquerors of the Atlantic a great deal. Between the two crossings the twelve Curtiss Conqueror engines of the *Dornier-DOX* were increased, in horse-power from 600 each to 650, but the added power alone was not responsible for the great difference in the record of the two journeys. Mistakes were made on the westward flight which only experience could rectify, and the swift return to Europe indicated that the various minor changes made while in New York added tremendously to the general efficiency of the seaplane.

It was after this flight that many people argued that only the airship could possibly carry a large number of passengers and make payable flights across the Atlantic. It is doubtful whether any heavier than air machine could fly more than 50 passengers at a time over the ocean. An airship, however, could carry 150 easily, as well as much baggage and plenty of supplies. The fact that the *Graf Zeppelin* up to date has made some 30 successful crossings of the Atlantic, and a British airship, too, made a safe if not spectacular crossing, suggest that the airship is still a factor to be reckoned with on long ocean travel.

But day by day, as I write, the conquest of the Atlantic continues. It is history still in the making. Space does not permit detailed accounts of the fine achievements of Wiley Post and Harold Gatty, James Mattern, and several others. Perhaps the experiences and data gained by these lone flyers can best be summed up in the spectacular flight of the Italian armada of 100 airmen from Ortebello to Chicago, commanded by General Balbo. The twenty-four Savoia Marchetti flying-boats, in perfect formation, flew through mist, rain and cloud, arriving safely at Chicago and thus completing a 6000-miles journey.

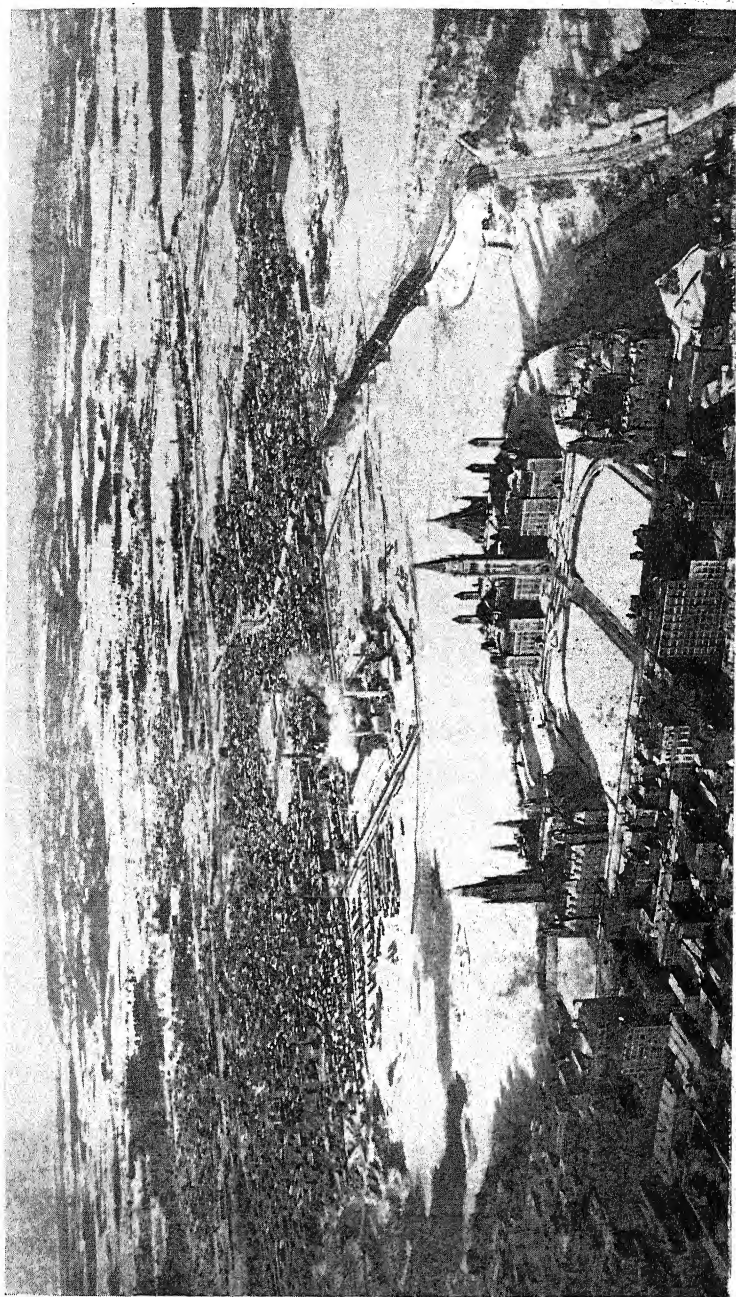


Photo by courtesy]

OTTAWA IN WINTER



Photo by courtesy]

NIAGARA FALLS

[Royal Aeronautical Society

THE ATLANTIC ROUTE

It was on July 1, 1933, that this biggest and most daring flight in the history of flying began. It surpassed the flight of the twelve Italian flying-boats across the South Atlantic in 1931. The route was via Iceland, and General Balbo will be the first to admit that the original survey work by Imperial Airways along this route of the Arctic Circle was of immense value to him.

On his arrival at Cartwright, Labrador, from Iceland, on July 12, General Balbo sent the following dramatic wireless message to Signor Mussolini:

"For the first two hours flying conditions were very difficult. Visibility was bad, the sky was overcast, and there were low clouds. We were forced to fly virtually on the surface of the sea, often having to fly 'blind'.

"From the third to the fifth hour the flight was a nightmare. We passed through such thick fog that we could hardly see the ends of our wings. To avoid the danger of accumulating ice on the wings, we kept as low as 300 feet.

"Later we found open sky at 2500 feet. From the tenth hour on the sky was almost clear, but there were heavy seas, and a strong head wind hampered our progress and we were only able to average 124 miles an hour.

"Because of the difficulties at the start and the difficulty of flying through clouds, our formation was frequently upset. While I am writing this report the twenty-fourth seaplane is landing.

"The crews are worthy of the task entrusted to us by your Excellency both for the prestige and fortune of the Fascist Fatherland."

II

Atlantic rollers, foam crested, dashed and tumbled on the yellow beach. The rags of clouds had been dispersed by the wind. The empty blue expanse was changing white in the glare of a brilliant sun.

And the aeroplane, with its heavy load of petrol, stood on the beach, its nose pointed towards the Atlantic. A swing of the propeller, and it would have roared into life. Five minutes

work by the pilot and it would be ready to adventure that gigantic stretch of ocean and wing towards New York.

The day seemed perfect. But the pilot hesitated. In his hand was a slip of paper. That paper, fluttering in the breeze, was the latest weather report gathered from ships cruising the Atlantic. It told of fog, high winds and storms beyond the horizon. Its mystic symbols told the pilot that a night of horror awaited him in mid-Atlantic and that it would be a miracle if his machine survived.

So he shook his head regretfully.

"Not to-day," he murmured to the little group of men and women beside the machine.

A few grumbles, a sigh of disappointment, and another Atlantic flight was postponed or abandoned. The scene was on Pendine Sands in South-west Wales, and as I stood and watched it I debated as to whether these Atlantic flights were worth while.

For the lone flier there are not many days in a year when good weather favours an Atlantic adventure. Firstly, it is essential to fly during a good moon. This is confined to six days a month. The winter months must be ruled out because of the storms. This confines an attempt to the months from May to September. Thus there are but thirty possible days in the year, although flights over the ocean have been tried in one or two later months.

But these lone fliers depend chiefly upon luck. For the most part they are seeking fame and fortune. Whatever their machines may lack technically, however wild and furious the storms through which they must fly, they believe that splendid courage, good navigation, and, above all, luck will bring them through.

And even though the goal may be fame and fortune, I think these lone fliers deserve all the bouquets, the junketings, and the money that comes to them once they reach the other side of the Atlantic. It is a feat worthy of all praise. The aviators themselves are the first to admit that they contribute little to aeronautical science. More can be learned from the study of an air liner that has travelled some thousands of miles over a regular route than from speculation regarding the fate of a machine that has disappeared in the Atlantic wastes.

Ever since Lord Northcliffe, with brilliant journalistic foresight, offered a prize of £10,000 for the first flight across the Atlantic, there has been much money or fame or both for those who accomplished what Alcock and Brown achieved as early as 1919. Colonel Lindbergh, hailed after his flight as "an ambassador of good will", himself asserted that he was flying for the Orteig prize of \$25,000.

Amelia Earheart, after landing in Ireland, admitted through the microphone: "I realize this flight has meant nothing to aviation. After all, there have been a great many who have flown the Atlantic, and such crossings will become commonplace, possibly not solo ones, but regularly scheduled transatlantic crossings."

To-day, when many long-distance fliers such as Wiley Post and James Mattern take the Atlantic in their stride, the perils of ocean flying may seem to have lessened. But actually those perils have increased, as General Balbo in his mass seaplane flight discovered. What these ocean flights have accomplished is the collection of weather data from ships at sea and an international code of signals which has made the weather charts of the Atlantic the most complete of all the seven seas.

If there had been such weather maps in existence in those early days we might have been spared many a reckless flight, many a brave air-pioneer. There was that extraordinary scene on an English aerodrome in the dawn of August 31, 1927, the year in which the French airmen Nungesser and Coli had already lost their lives in attempting the westward crossing of the Atlantic.

Standing on the tarmac of the aerodrome was a large monoplane with two pilots warming up the engines. Beside the cabin door, posing for photographs, laughing good-byes to friends, and eager for adventure, was Princess Lowenstein-Wertheim, daughter of the Earl of Mexborough. She was clad in breeches of purple velvet. The two pilots, both splendid fliers, were Lieut.-Colonel Minchin and Leslie Hamilton.

But the scene was suddenly conjured into a religious affair by the arrival of a Catholic archbishop in his robes. The draught from the propellers wafted and fluttered his garments.

The archbishop gave his blessing to the Princess, the two

pilots, and the machine. Holy water was sprinkled. The two pilots took their places. But the Princess was not quite ready. She ran back towards the archbishop, bestowed a last passionate kiss upon the episcopal ring, and then ran again to the machine and climbed aboard.

Her last action was to lean out from the cabin of the machine and say to a newspaper man that her last message to England was : "I am confident and I am unafraid."

At 7.15 the machine took off.

It was never heard of again. It disappeared into that Sargasso of the air from which the ships of the skies never return.

There was the day when Mrs. Grayson with three others set off from New York to fly to Europe. This brave woman left behind her a document—only to be opened if anything untoward happened. Beyond Cape Cod something we shall never know did happen. Probably it was the call of the "still small voice" of which her document spoke and which had prompted her to challenge Fate.

And so the tragic story continues. There was *Old Glory*, the machine that bore Lloyd Bertrand, James Hill, and a man named Payne to their death flying from Maine to Rome ; the fliers, Mrs. Beryl Hart and Captain Maclaren, who so hopefully entrusted their craft *Trade Wind* to the elements and died between Bermuda and the Azores.

Also there is the pathetic story of the 'plane *American Nurse*, which carried Miss Edna Newcomer, a hospital nurse, who was used to making parachute flights, together with two other experienced pilots, on a flight that was to finish in Rome and ended in the tumbling waves. She would make a parachute descent over Florence, she said, in honour of Florence Nightingale. When the propeller was already whirling, she went back for her best frock. "It would be terrible to be presented to the King of Italy and have nothing fit to wear," she said.

Again one asks, Is it worth it ? Let us consider, however, that often great financial rewards have awaited some of those brave and spectacular pioneers who, pursuing fortune successfully, achieved the other side of the Atlantic.

It is estimated that Atlantic fliers have earned between them £250,000 from their flights since the war.

I think, however, that one can safely say that the real value of these Atlantic flights is in the reaction of the public towards them. The lone adventurers are well featured in the newspapers. They become the heroes of boys of all ages. And the public begins to realize that the air conquest of the Atlantic has arrived. The aviators survive. They tell the story of storms, fogs, winds and sleet. The public appreciates and applauds the bravery. But they have now been brought to a state of mind to expect success rather than failure.

A tremendous impetus has been given by these flights to the charting of weather maps. In the five years since Colonel Lindbergh flew to Paris the science of gathering and mapping accurate weather data has become comprehensive and exact to an extraordinary degree.

Already the charts made out so painstakingly by meteorologists in New York, London, Paris and Berlin on the basis of observations taken by steamship captains over all parts of the Atlantic are of incalculable value to aviators.

An international arrangement has been made for the reciprocal service. Captains of ships have learned the formula which meteorologists and wireless men use. They now make a standardized series of observations, and these are all collected in a simple code easily translated in every language from Chinese to English. More shipping lines joined in the movement, until now it is possible to cover the North Atlantic with a blanket of weather data, and with very little guessing.

So far this international service is the one great contribution of transatlantic flying. The Service has helped to reduce the risks of lone fliers by giving them complete knowledge of the route they have to traverse. But there are still several difficulties unknown to ships which the Atlantic flier has to face.

One of the most deadly of these is barometric pressure. The airman's height-indicator is nothing but a barometer which shows the change in the pressure of the atmosphere when the aeroplane climbs or descends, except that the airman's indicator shows height in feet instead of pressure in inches. Half an inch on the barometer is equal to approximately 1000 feet on the pilot's height-scale, and conditions have been known when an aeroplane starting out from Europe at 2000

feet would fly into the sea midway across the Atlantic while still recording 2000 feet on the pilot's height-instrument board.

Then another deadly danger is the strong up and down currents which occur in the vicinity of electrical storms. These currents impose great strains on a heavily loaded machine, and may even cause disaster by rapidly changing the loads upon the structure. The American airship *Akron* was destroyed in a storm of this kind.

Also there is the risk of ice formation on the wings. This happens only within a narrow temperature range of about six degrees, that is, from about 28 degrees to 34 degrees Fahrenheit, under conditions of wet fog.

But many of these conditions have been dispelled by the tuition of pilots in blind-flying and also the use of the robot pilot. So far the robot pilot has not proved itself absolutely infallible. Wiley Post used it successfully on his recent lone flight across the Atlantic, but it began to go faulty when he was flying across Europe. The R.A.F. flyers on their record non-stop flight to the Cape found it useful for some hours, when they too discovered it to be faulty.

For the rest, it requires luck and, above all, bravery and endurance to attempt the Atlantic alone. And despite the growing lack of monetary rewards and even maybe the enthusiasm of the general public, there will still be many fine young men and women willing to attempt this greatest of all adventures of to-day.

III

Within recent years the South Atlantic as an airway between the Old and the New Worlds has been seriously considered by several of the big aviation companies. The South Atlantic has many advantages. It is a better fair-weather route than the North Atlantic. There are none of the treacherous fogs or the stormy conditions met in the neighbourhood of Newfoundland. Moreover, between West Africa and the nearest landmark in South America the distance is about 1800 miles.

South America is a sympathetic goal for European aircraft. To the land where Spain once sent its galleons, France and

Germany now send their high-powered 'planes and airships. The route is likely to be so profitable in rich cargoes that these Continental nations are competing in inventing aircraft capable of flying the ocean gap between Africa and America.

This fight for the air route of the South Atlantic increases in interest and intensity every day. Between 1922 and 1932 there have been eleven crossings of the South Atlantic by 'plane besides the mass flight of Italian seaplanes under the command of General Italo Balbo, when ten 'planes made a trip almost in formation.

Certain it is that Imperial Airways still has under review the possibility of operating, in conjunction with foreign air interests, a service between Europe and America via the Azores and Bermuda. Recently, at the request of the Governor of the island, a representative went to Bermuda to assist the local Administration in the selection of an air port for the Colony. It is contemplated that this air port will be used, in the first instance, chiefly for tourist traffic between Bermuda and the United States. Attention is being given to the question of the most suitable type of aircraft for the operation of a transatlantic air service.

Near the equator, where South Atlantic flights are made, trade winds blow steadily from the east, speeding up 'planes flying west and slowing them down flying east. This is exactly the reverse of conditions over the North Atlantic. The trade winds were of considerable help to Mollison when he made his record crossing of the South Atlantic. He was the first man to fly alone across the South Atlantic from east to west, and took about eighteen hours for the journey. This was accomplished in February 1933.

Before this, however, that very fine aviator, Bert Hinkler, had achieved a brilliant solo flight across the South Atlantic from west to east. This flight never received the full publicity that was due to a very gallant aviator. But then, Bert Hinkler evaded publicity like the plague.

Hinkler was the least talkative airman who ever attempted a long-distance flight. He had, too, the distinction of looking utterly unlike the long-distance flier of popular imagination. His slight figure and diminutive stature were hardly suggestive

of the robustness of constitution which such feats of endurance require.

After his flight across the South Atlantic he was the guest at dinner of the Prince of Wales. The Prince asked Hinkler to let him see his maps used on the flight. Hinkler blushed and stammered out the fact that he had not carried any maps at all.

Hinkler's disappearance and death in the mountainous region of South Italy was a great loss to British aviation. He was a lone pioneer in the air in the true sense. He flew alone because he preferred to fly alone. And the records he achieved, particularly the one to Australia, were of great utility in the subsequent development of civil air lines.

It is interesting to record that the first machine to blaze an air trail from Europe to South America was an early model of the Dornier-Wal. In 1926 Commandante Ramon Franco and three companions behind an English Napier engine flew from Spain to Buenos Aires, taking two weeks for the journey and making frequent stops. They took off for this historic journey from the same bay of Huelva out of which Christopher Columbus, 434 years before, had sailed in his *Santa Maria* on the voyage to the New World.

The first non-stop crossing came in October 1927, five months after Lindbergh's dash to Paris. With one companion, the famous French flier, Captain Dieudonné Costes, left St. Louis, Senegal, Africa, and headed his Breguet land 'plane south-west over the Atlantic, landing nineteen hours and twenty minutes later at Natal, Brazil.

In the two years after Costes' exploit three pilots flew non-stop from Europe to South America. Two started from Seville, Spain, while the third, Major Carlo del Prete, took off from Rome, Italy, remained in the air fifty-nine hours and fifty-nine minutes, and covered 4450 miles before he brought his record-breaking monoplane to earth at Natal.

The most careful survey of conditions over the ocean airway between Africa and South America was made during the past years by the *Graf Zeppelin*. Under the direction of Hamburg American officials this famous dirigible made ten round trips between Friedrichshaven and Brazil. In a previous summer it had crossed the South Atlantic six times.

One of the most spectacular crossings was that westward in 1933 from Seville to Cuba by the modern conquistadors Barberan and Collar. These two Spaniards flew nearly 5000 miles in thirty-nine hours, easily and comfortably. That flight revealed that aeroplanes to-day have almost reached the range necessary for trans-oceanic crossings with payable cargo loads.

But the east coast of South America was joined to Africa in 1933 by a flight that lasted only fourteen hours. It was accomplished by a French giant three-engined aeroplane, the *Arc-en-Ciel*, piloted by Jean Mermoz, one of the regular pilots of the French Aeropostale Company, now amalgamated in Air France.

This flight was the first of a series of transatlantic trips to demonstrate the practicability of using heavily loaded aeroplanes for long-distance flights, and the possibility of a regular heavier-than-air service between Europe and South America. The *Arc-en-Ciel's* weight when she took off was 12 tons. The 2000 miles from America to Brazil were covered in fourteen hours, an average of over 142 miles an hour. The pilot, Jean Mermoz, has now crossed the South Atlantic by air successfully twice, and a third time he came within 350 miles of his destination and alighted at sea because of an oil leak.

All these pioneer flights have gathered valuable information to those companies now fighting for supremacy on the South Atlantic air route. France, which has already linked by air many of the South American countries, is determined to succeed in the ocean crossing. The famous French aircraft firm, Blériot and Co., are now completing a big flying-boat ordered by the French Government for this long sea route. When the boat is ready and in service, the crossing will be made in less than a day. It will then be possible to travel in a regular service from Paris to Buenos Aires in six days.

This service is to be operated by the Air France Company. At present the ocean route is covered by fast liners, and aeroplanes take the mails as soon as they are landed from the steamers. The Argentine Government has offered a subsidy for the company providing these flying-boats are soon in operation.

Air France's line runs by way of Madrid, Rabat, and Casablanca, and on the American side is continued through Pernambuco, Bahia, to Buenos Aires. There are air routes

thence to Santiago and other cities. The distance from Paris to Buenos Aires is about 8200 miles, and the service is weekly.

The new Bleriot-flying boat, designed by M. Philip Zapata, is a high-wing monoplane fitted with four Hispano-Suiza engines of 640 h.p. The crew will consist of the captain, two pilots, and an engineer.

But the Germans also have been at work along this ocean route. Their intention of providing a regular flying-boat service from Africa to South America was emphasized by the sailing recently from Cuxhaven of a steamer, the *Westfalen*, to act as a floating aerodrome. This ship with a crew of forty has taken up its position midway along the ocean route.

The *Westfalen* has been tested in the North Sea. It is an old North German Lloyd liner of 5000 tons, which has been rebuilt specially for the purpose of helping flying-boats.

This air island will cruise dead slow in a certain area. Smoke signals during the day, and searchlights of immense candle-power and flares during the night, will guide the pilots.

Flying-boats will, of course, not land on the *Westfalen* itself, but on a large tow-sail which will be dragged forward on the surface of the ocean. The flying-boat will then be hoisted up by powerful cranes. When about to resume the flight, it will be shot off with a catapult as are naval aeroplanes from their mother ship.

In addition to being a floating aerodrome, the *Westfalen* will also be a laboratory, for it is well equipped with meteorological instruments and carries a small band of experts to check the currents and winds of the ocean. A regular air-mail service between Europe and South America will begin shortly, and if everything goes satisfactorily a passenger service will afterwards be introduced. Berlin to Rio de Janeiro will then be three days' journey.

And even the Italians have refused to be left out in this struggle for the South Atlantic airway. For the past two years Italian experts have been busy compiling weather data and other information vital to a trans-oceanic air line. They have even worked out time-tables and elaborate cost figures. Latest advices from Rome indicate that the construction of the Italian planes will be pushed forward at top speed.

Meanwhile the United States has not allowed these European efforts to go unchallenged. Pan-American Airways has already cut the travel time from Miami in Florida to the Argentine to a third of the steamship time. Eastern Air Transport also brings passengers and mail to Miami from New York in about eleven hours. This means that the Atlantic air traveller can go from New York to the Argentine to-day in less than eight days.

And when the air traveller reaches South America, what then? He will find that the great continent is linked with air lines, and that he may cross the Andes, that immense mountain barrier, by French or United States' planes. The route between Santiago, Chile and Buenos Aires is generally regarded as the most difficult aeroplane route in the world. Fog, rain, sleet, hail and blinding snowstorms in the Andes are accepted as the day's work. And this mighty mountain barrier necessitates planes which can climb 20,000 feet with a full load in 35 minutes.

In another chapter I have given some of the extraordinary adventures and experiences of the French pilots who fly regularly over this route. One of the chief dangers is the mass of cloud that smothers the high peaks and which is apt to deceive the pilot who flies above the clouds.

There is the story of one mail pilot who had taken off from Santiago in a fog. Up and up he circled, through layer after layer of mighty clouds, soaring to 19,000 feet, where the air was cold, the humidity for that temperature near the saturation point. Ice formed in the carburettor and choked the engine. The engine spluttered and almost stopped. Aloft, 19,000 feet, clouds stretching away like ocean surf, shielding jagged peaks, and no power.

Nothing to do but come down and, making allowance for wind drift, hope that he would land in the Santiago basin. But as he shot into a clear gap among the clouds at about 7000 feet the flier was facing—not the haven of a landing-field, but a sheer snow wall of mountains. The motor was picking up; he must stay aloft; so he swerved into a canyon that seemed to end blind. But it was his only chance. Above him were dense clouds thousands of feet thick. Completely encircling him, dimly seen through the vapours, were mighty peaks of the Andes. He had no idea of his location. Suddenly he saw the canyon

curve; and trickling through it was a small creek, which must have an outlet. Down the canyon he flew, following the creek, which became broader and broader and finally spread out into the Mapacho River which flows into Santiago.

Decidedly the South American route can be romantic and adventurous.

IV

And now we must consider the most direct route of all across the Atlantic, the Arctic Circle route. This is the one which is being tackled by Imperial Airways, and will bring Canada within two days of Britain. Already the route is mapped and surveyed. General Balbo and his Italian seaplanes have also proved its feasibility.

The significance of the Arctic air route to America in relation to plans for regular Atlantic air services is shown by the attention paid to it by British, American, Italian, and German expeditions in turn.

Undoubtedly the shortest route across the Atlantic is the straight flight from Ireland to Newfoundland. But this is the least likely air route, for it involves a long sea flight, with bad climatic conditions, including fog. Naturally such a route is very unreliable, and so is not likely to mature. The other possible route for British fliers follows an almost straight line from London to Winnipeg in Canada, and passes over the northern-most point of Scotland, the Faroe Islands, Iceland, Greenland, Baffin Land and Hudson Bay.

This route, passing as it does through Arctic regions, seems hardly likely to offer ideal weather conditions to travellers, but it has one outstanding advantage. At no point on the proposed route is there a sea-crossing greater than 300 miles. In some ways, too, this is the oldest line of communication between the two hemispheres. The Vikings used it for their westward passage to the New World. Almost 400 years ago the hardy fishermen of Brittany and Devon were hovering about the banks of the coasts of Labrador and Newfoundland. Later explorers sought the North-west Passage to India by way of Davis Straits and Baffin Land, and nearly ten years ago Lowell

Smith and Eric Nelson, with the United States Army flying-boats, pioneered the route westward by air.

Others followed in their trail, notably the German, von Gronau, who twice made the journey—the second time to Chicago direct, and in 1930 to Chicago by way of New York. Then Britain sent out survey parties to Greenland, and so did Denmark, seeking to find out all about the best landing-places and especially what may be expected in the way of weather.

The famous Arctic explorer Dr. Vilhjalmur Stefansson was the first to advocate the use of aeroplanes over this area. His views, first published August 1922, were regarded at the time as fantastic. But since then aviation has progressed. Aviators, scientists, and eventually commercial men decided there was something in the idea. They began to explore. The first scientific necessity was real data about weather conditions. Professor Alfred Wegener, veteran of a Greenland crossing with Koch in 1913, took a large and splendidly equipped German expedition there in 1930, partly for the study of weather toward the establishment of the Greenland-Iceland commercial route. Wegener became one of the martyrs to the cause. He died in November 1930, and the story was told that he had walked out from his camp on the inland ice to face starvation and death so that the small amount of food left in camp would suffice to keep alive the rest of his men and allow them to continue their important work.

That same year Britain sent the Arctic Air Route Expedition to the east and centre of Greenland. This expedition was under the leadership of Mr. H. G. Watkins, and accomplished splendid work. The purpose of this expedition is now fairly well known. Greenland's most striking physical feature is the ridge of high land, or Ice Cap, whose average elevation is between 8000 and 9000 feet. This Ice Cap, in modern meteorological theory, is the chief factor influencing weather in the Atlantic system, and here are to be found the originating causes of instabilities which affect the weather equally of Montreal and Manchester. Greenland is an essential part of the Arctic air route, and therefore investigation of the little-known conditions on the Ice Cap was of importance both meteorologically and

aeronautically, and it was to explore them that the Arctic Air Route Expedition set out.

The expedition did not completely fulfil its ambitious plans, but it traversed the Ice Cap in two directions, it climbed Mount Foré, most formidable and highest of Greenland's mountains, and placed a station on the Ice Cap itself, where for five months Augustin Courtault kept solitary watch while Europe frantically organized rescue expeditions, and Watkins quietly completed the relief of the station according to plans prepared beforehand by him.

In conformity with the main purpose of the expedition, flying was carried out in the two "Gipsy Moths" taken with the expedition, and the report of the 86 hours' flying by the pilot of the expedition, Flight-Lieutenant D'Aeth, is extraordinarily interesting and useful. Incidentally, the expedition indulged in a daring 500-miles' journey to the southernmost cape of Greenland in an open boat.

Flight-Lieutenant D'Aeth found that the weather in this region during summer was almost monotonously fine with practically no wind, and flying conditions were generally excellent. Fog, for which the coast has a bad reputation, was scarcely ever encountered except for a period of about ten days at the beginning of May, when the sea ice breaks up. Otherwise he found that, though ice fog is often present over the pack ice to seaward, it hardly ever reaches the coast.

It was also found that there is always the serious risk of a forced descent away from the base, which would be almost certain to have fatal results. This risk could be reduced to almost a negligible quantity by having multi-engined aircraft capable of flying with one power unit completely out of action. It would seem, therefore, that, given multi-engined aircraft operating from one of the lakes, the summer conditions on the coast could hardly be bettered.

The periods in which the lakes would not be fit for use are about six weeks from the middle of May, when the ice is breaking up, and about five weeks from the beginning of October. The violent gales should not rule out winter flying. It is true that an aeroplane would need high power to fly through them and certainly could not land, because the drifting snow reduces

visibility to a few yards; yet their local character means that they could soon be crossed, and, apart from them, winter flying conditions are good. Altogether, Flight-Lieutenant D'Aeth was definitely of the opinion that with proper organization the Greenland air route to Canada could be used.

It was a great tragedy that Mr. Watkins on his next expedition to Greenland should have been drowned in a canoe among the ice packs. He was a splendid young explorer, with a brilliant future before him. And he had already proved himself in the Arctic Air Expedition.

Mention should be made of another air explorer on this route, a believer in its feasibility, but who came to a tragic end. He was an American, a fine pilot, known as 'Shorty' Cramer. Cramer, with a companion named Oliver Pacquette, set out in 1931 to fly the Arctic Route from America. They did splendid work over Greenland and Iceland, and reached the Shetland Islands. Then, within sight of the end of their journey, Cramer and Pacquette were drowned in the North Sea on the way to Copenhagen. Meteorologists had warned them not to leave the Shetlands at that time because of the weather. But Cramer was anxious to reach Copenhagen by a specified time. A reception was being planned there for the American fliers. Wreckage of their plane was picked up in the North Sea shortly after the tragedy. With it was a package containing Cramer's passport and—dramatically—a map that had been published by Stefansson with his first exposition of the Greenland-Iceland route as a commercial possibility.

The importance of this air route to Britain and Canada is obvious. But, as on the South America route, there is a fight for supremacy proceeding. Imperial Airways is well advanced with its plans, but the Americans have not been idle. They have, in fact, been hustling.

For example, an American went to Finland not very long ago and obtained exclusive rights to carry the United States mails through that country on intercontinental air traffic for fifteen years. Then Denmark was approached. They granted exclusive American rights for three years to carry out research in Greenland towards the establishment of a trans-Greenland commercial air service. The contract stipulated that the

American company was to send at least two expeditions to Greenland, and that at the end of three years of study and flying a concession would be granted for commercial flying across Greenland if both Americans and Danes were satisfied that the air route was feasible. The three-year research contract with Denmark ends in 1935.

The Pan-American Airways bought these concessions and selected Dr. Stefansson himself to supervise the research work along the Arctic Route. Thus the man who first advocated it is now at the head of a vast organization. And, to emphasize that they mean business, Pan-American Airways sent Colonel Lindbergh and his wife flying along the route for a special survey.

This American Company has announced that it was building six giant flying-boats, larger than anything hitherto flown on commercial air routes, for use over the North Atlantic between America and Europe. These fifty-passenger planes, designed to fly 2500 miles with full load, will probably go by way of Greenland and Iceland. The keels of these superplanes have already been laid, and work on them is progressing.

They were laid down with the thought that they might be used between Bermuda and the Azores, on a trans-oceanic service operated jointly with Imperial Airways of Great Britain and Air France. Recently Pan-American has turned its eyes towards the Far East with the acquisition of air lines in China and these same planes, it is confidently expected, will be efficient enough for the transpacific jumps, with stops at Hawaii, Midway Island or Suva, to the Philippines and China.

The international importance of this Arctic air route was emphasized by the recent conference at St. John's, Newfoundland, between representatives of Great Britain, Canada and the United States. They debated the question of establishing an international airport which may possibly lead to the establishment of a ship-to-shore air service, with distributing air links operating from St. John's to Canada and the United States. This is to be an intermediate stage in the development of the Arctic air route.

"The fact that Great Britain has no Atlantic flying-boats under construction", stated *The Times* when reporting this conference, "need not be taken as a sign that this country will



Photo by courtesy]

R 100 IN CANADA ; SIGNATURES OF CREW AND LANDING OFFICERS

[Canadian Airways

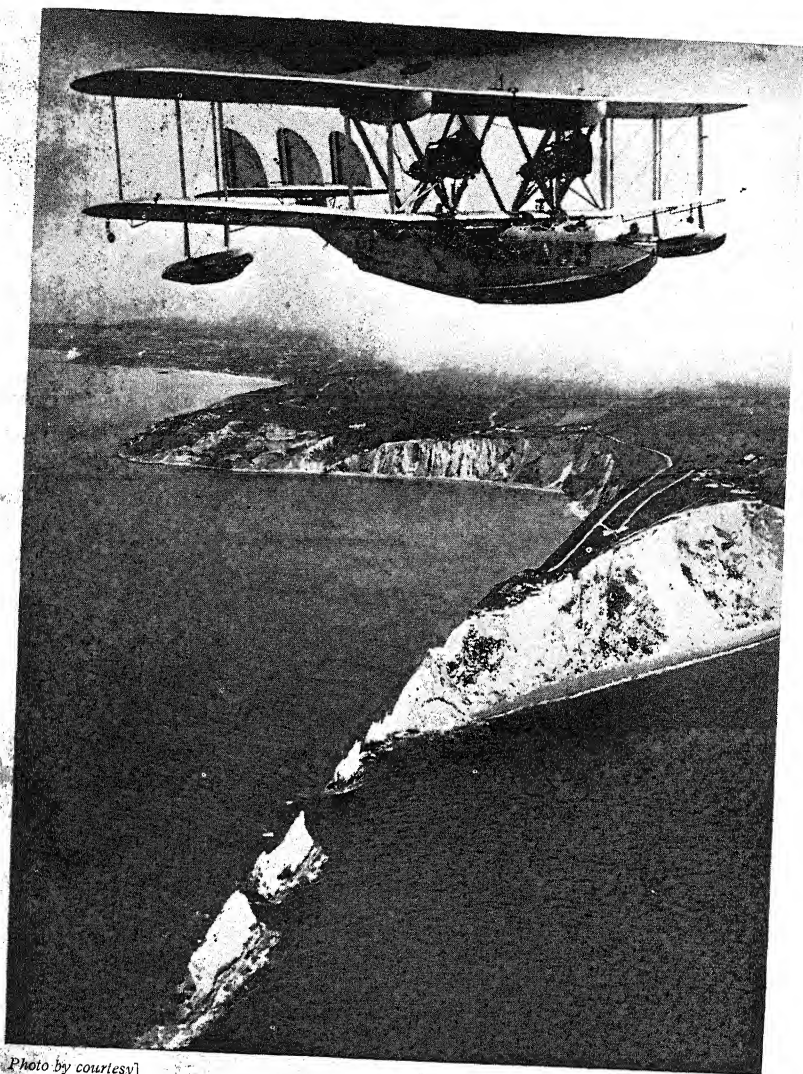


Photo by courtesy]

[Chas. E. Brown

SUPERMARINE SOUTHAMPTON (NAPIER) OVER THE NEEDLES, I.O.W.

be late on the Atlantic run. The British aircraft industry has more knowledge and experience in the production of seaworthy flying-boats than any other country, and has at least one military model with which operating experience is at present being obtained."

In a general summing-up of the possibilities of the Atlantic route it was argued that the flying-boat which could undertake a regular service across the North Atlantic has not yet been built or commissioned, but there is no final reason why the direct course from Ireland to Newfoundland should not be taken at certain times of the year or in one direction only. During the summer months it might just be possible to operate services in both directions, though the prevailing west wind might lessen the load on the westerly run until the service became uneconomic. On the other hand, the easterly trips from Newfoundland might prove the best plan in good weather, allowing the return journey to be made by the safer northerly or southerly routes.

I can best conclude this survey of the Arctic air route by the report of one of the two commissions into which the International Congress of Trans-oceanic Aviators, which met in Rome in May 1933, resolved itself. This commission, headed by Commander H. C. Richardson, formerly of the United States, made a report on the Labrador-Greenland-Iceland route.

"With existing equipment this route could be flown," it says, "as it affords intermediate stations at reasonable distances. It would be necessary, however, to establish complete meteorological and radio services and many landing and maintenance facilities. A definite survey of each step should first be made to determine the variation in route necessitated by daily and seasonal changes in conditions. Attention is drawn to the fact that during the summer fog seldom extends far inland or over inland waters, and that generally when there is fog on one coast of Iceland it is clear on the other coast. This applies also to Greenland. It would be necessary to have alternate landing fields in both countries and have traffic directed by radio as circumstances required. It is considered that all-year flying is possible over Greenland to Iceland, but that difficulties would be met in the form of icing of machines and irregular, suddenly

changing strong winds on the North Sea section during the winter months. It is considered that flying-boats could land and take off from the deep snow on the Greenland plateau, and that lake landings in the northern areas would be possible except during two short seasons of the year."

V

The importance of Canada in this scheme of North Atlantic airways is obvious. Canada, in fact, becomes the keynote of any big scheme. Canada, by reason of its geographical position, must play a paramount part.

What is apt to be forgotten in Britain, or rather what has never been learned, is the valuable aerial reconnaissance and work achieved by the Canadian air authorities for the furtherance of the Atlantic project. I have before me as I write a memorandum describing the development of aviation in Canada which is, indeed, amazing.

The advantages of Canada's geographical position in the long-distance airways of the future was realized from the beginning. The shortest routes leading to both Europe and Asia lie within Canada or the territories near the coasts. It was decided that if Canada was to take advantage of this geographical position a beginning should be made to develop local airways and install the necessary aids to navigation which modern science was placing at the disposal of aviation.

Experimental flights were made in the winter of 1927 to and from the pilot station and Rimouski, 330 miles below Montreal, where steamers on the St. Lawrence route made their first and final connections with Canada. The results of the experimental flight showed that a saving of time from 12 to 24 hours could be achieved in the dispatch of eastbound transatlantic mails, and from 24 to 48 hours in the delivery of incoming westbound mails. A regular service was begun in the spring of 1928 and has continued with increasing efficiency since that day.

Plans have been considered and experimental flights made for the extension of this service from Rimouski still farther eastward to the Straits of Belle Isle or Cabot Straits, depending on the season of the year. In the summer season of navigation,

when the Straits of Belle Isle are open, one third of the transatlantic distance from Quebec to Southampton may be flown and the mail safely delivered to a steamer two days after she has left her port of departure. By this method, with steamers now on the route, mails may be delivered to all parts of the American Continent faster than by any other means. The 950 miles' flying involved calls for no passage over open ocean and the plane is within reach at all times of communications now established. Thus, without facing the problem of transatlantic flying, the Canadian route can in the summer months show a clear gain in saving of time in the delivery of transatlantic mails.

The importance of the Atlantic coast on the world's airways is also shown by the activities of the past two summers when transatlantic liners catapulted seaplanes carrying mails from their deck some hundreds of miles off the Newfoundland or Nova Scotia coasts, whence they were flown via Sydney and Halifax to New York and delivered at least twenty-four hours in advance of the fastest all-steamer mail record.

An alternative transatlantic route still farther north has also been considered, and investigations are proceeding to determine the practicability of an airway from Cochrane, in Northern Ontario, via Hudson Straits, Baffin Land, Greenland, and Ireland, to Europe. British, Danish, German, and United States interests, with the support of their Governments, have all shown an active part in the investigation of its possibilities during the past three years.

As early as the summer of 1922 the Canadian Government sent an experienced flying officer north to Baffin Land, North Devon Island, and Ellesmere Island to determine the flying conditions in the Far North, and since then have established meteorological observation posts throughout the Arctic Islands to study the weather and flying conditions. In 1927 and 1928 the Royal Canadian Air Force maintained three air bases on Hudson Straits and carried out flying operations continuously for eighteen months to determine the season of open navigation and investigate ice and meteorological conditions. The importance of the route to Canada is obvious, not only from the point of view of an intercontinental service, but because its eastern half gives

direct communication to the Canadian Arctic archipelago and the numerous outposts of civilization now maintained there.

The approaches to the direct transatlantic route at both ends lie within the British Commonwealth. The self-governing Dominions of Canada and Newfoundland are the approaches to its western terminal from the North American Continent, while the approach from Europe lies over Great Britain and the Irish Free State. To treat this great international airway as being of purely British concern would be to ignore the facts of geography and to detract from the economic possibilities of the route. Just as all the great maritime Powers maintain transatlantic steamer services, so eventually will the airway be traversed by the aircraft of all nations participating in the commerce between Europe and North America.

Incidentally, the shortest route from North America to Northern Asia also lies through Canadian territory, and the flights over this route during the past few years are but the shadows of coming events. The approaches to both great intercontinental airways are through Canadian territory, and the development of Canadian airways will be strengthened by every effort expended on them.

From the Canadian point of view, the great-circle route via Nova Scotia, Newfoundland and Ireland appears the best. Its development is not without difficulty, and there is as yet no aircraft in sight which can guarantee a regular service. The greatest obstacle is the strong, almost continuous westerly wind which prevails on the North Atlantic, rendering the westbound passage a lengthy one in time, as compared with the eastbound. It is estimated that the average westerly wind is 35 miles an hour throughout the year. To overcome this handicap high cruising speeds must be obtained, with a range of at least 2500 miles, to give a margin on the flight from Ireland to Newfoundland. That aircraft capable of performing this regularly will be available before many years pass is undoubted.

But the great scheme of Atlantic airways depends upon quick and effective inland airways. In this direction Canada has shown amazing progress. I can, alas, only give a brief survey of that progress. It would, indeed, be worthy of a volume full of romance and adventure, entirely devoted to this great Dominion.

Canada began to develop its airways immediately after the war. The Dominion possessed some of the finest flying men in the world. Canada during the Great War had a greater proportion of war pilots to its population than any other Dominion. And the war records of those pilots are still to be marvelled at.

Canada was fortunate in having in the undeveloped North a virgin field where aviation could find an outlet. To its development the Dominion must look to increase her wealth and population, and the first necessity was better means of transport. Throughout three-fourths of the area of the Dominion the historic modes of travel—a dog-team in winter and canoe in summer—still held undisputed sway. Here was an immense field waiting, where aircraft could play a useful part and compete with the existing means of transport.

In 1927 the postal authorities decided that the time had come to inaugurate a programme of airway development in the Dominion. They had watched with growing interest the extension of aviation in the Far North, the increased reliability obtained with the production of aircraft and engines suitable for civil aviation, and the great advance in the air-mail services in the United States and Europe. Permission had already been given for the carriage of mails by air in the remoter parts of the country, and the growing use of aeroplane services made official recognition essential.

Air mails in Canada may be divided into two classes. The first serves the remoter parts of the country to which the carriage of mail on the ground is costly, inefficient and slow. These include the air-mail routes northwards down the Mackenzie valley from Edmonton to the Arctic coast, to the remote communities on the north shore of the Gulf of St. Lawrence during the winter, to the Magdalen Islands, isolated for five months, and to many mining camps in the North Country. There the conveyance of mails by air meant little or no increase in cost and an immediate increase in regularity and frequency, and much quicker delivery.

Then came the great and ambitious plan of a trans-Canada airway. Work was begun in the Prairie Provinces in 1928. Construction on the route between Winnipeg and Edmonton

via Regina, Medicine Hat, Lethbridge and Calgary is finished, and intermediate aerodromes have been built at intervals of about twenty-five miles along its length. These are fully lighted for night flying. Five radio directional beam stations have been installed, together with teletype communication and meteorological observing posts at all main aerodromes. This airway continued in daily operation from 1928 to 1932, when it was temporarily closed down for financial reasons. Daily air-mail services from Moncton, N.B., via Montreal and Toronto, to Windsor, Ontario, were also in operation during these years, and the route between Toronto and Windsor was equipped for night flying.

Though the financial crisis has retarded the development of the trans-Canada airway materially, construction on the remaining sections across the mountains from Lethbridge to Vancouver between eastern and western Canada from Winnipeg to Toronto and Montreal, and the completion of the airway between Montreal and the Maritime Provinces, is being undertaken as a relief measure for unemployed single men. When financial conditions once more permit the operation of the inter-city air-mail services it is confidently expected that the whole trans-Canada airway will be provided with a chain of landing-grounds at intervals of twenty-five miles from the Atlantic to the Pacific. Much work will remain to be done in the way of lighting for night flying and the installation of radio and weather services, but it will be possible to fly safely in daylight from coast to coast and find everywhere safe landing-grounds at reasonable intervals.

From this airway there is one deviation route into the United States. It is essential that 'planes flying between the two great countries should not be hampered.

On October 22nd, 1929, a formal agreement covering international flying between Canada and the United States was negotiated. It provides for the mutual recognition of the registration of aircraft certification of airworthiness and licensing of personnel or aircraft engaged in international traffic. It also provides for compliance with the customs, quarantine and immigration requirements, and prohibits the carriage of goods or passengers other than international—that

is, the aircraft of one country cannot participate in the domestic traffic of the other.

Co-operation between the United States and Canadian postal authorities in the interchange of mails has been constant for nearly a century now, and has been extended to the air-mail service. One of the earliest air mails instituted was that between Montreal and Albany, giving a connection southward to New York. The growing traffic on this line is shared by a Canadian and an American company, the northbound mail being paid for by the United States Government and the southbound by the Canadian Government. International connections are made across the border to New York and Albany, Windsor-Detroit, Pembina-Winnipeg, Seattle and Vancouver. By an agreement negotiated by the postal authorities of the two countries, letters bearing the Canadian air-mail stamp are carried all over the United States air-mail miles without extra charge, and in the same way the United States air-mail stamp is recognized in Canada. This broadminded policy is of great importance, and the benefits to Canada can easily be seen. A Canadian business firm in Montreal or Windsor gains access, without expense, to the many ramifications of the United States air-mail service. Canadian mails are carried daily between eastern and western Canada over the United States air-mail routes between Detroit and Pembina.

The magnitude of the air-mail services on the continent is seldom realized. Before the temporary stoppage of the Canadian inter-city air mails in 1933, due to the depression, a correspondent at Aklavik, on the Arctic coast of Canada, could post a letter there and it would be conveyed by air, without a break, to Pembina, thence by American air-mail routes to Mexico City, Central America and the islands in the Caribbean Sea, and to any country in South America as far as Buenos Aires or Valparaiso. The gain in time and convenience is immense, and the constant exchange of traffic by air meant much to the commerce of the countries on the western hemisphere.

In the same way much work is being done in New York, and in the United States generally, to emphasize the importance of Imperial Airways. American travellers are using Imperial

Airways more now than ever, and there is a general admission on their part that Imperial Airways provides service in the world second to none.

Special facilities and arrangements are made with the Atlantic shipping lines for the expediting of American mails destined for far-off parts of the Empire. As an example of the speed of this form of transport, it is possible to send a parcel of urgent supplies from San Francisco to Nairobi in sixteen days, a saving of about twelve days over any other form of transport.

Before sailing for Europe, many Americans book their passages by Imperial Airways in New York. Recent bookings included a man who was invited to join a big-game hunt in Kenya Colony. He lived in California, and on working out the length of time he would have to spend on the journey decided that he would be unable to go. The New York representative of Imperial Airways got in touch with him and eventually he joined the party. He left California on a Thursday, flew to New York, caught a fast boat at midnight on Friday, and arrived at Paris the following Wednesday, catching Imperial Airways African service the same night, arriving at Nairobi on the following Wednesday—fourteen days in all.

Another man received a cable stating that his son was very ill in a nursing-home in Surrey. He consulted the New York office and they arranged for him to leave the same night on a fast steamer which was stopped specially at Plymouth. A special plane was waiting for him, and he was flown to the nearest aerodrome, where a fast car conveyed him to his son's bedside.

Constant co-operation exists between American airways and our own Imperial Airways. The only missing link in this great international chain is the Atlantic. But a few years should see this ocean crossed by huge flying-boats, both American and British, and contributing to that international harmony which air services so finely bring about.

Pan-American Airways are willing to play their part in this great scheme. This great company has, with the help of first-class pilots and magnificent machines, done much to make the American nation air-minded. And they will not be behind in this bridging of the Atlantic.

CHAPTER V

TO INDIA AND AUSTRALIA

I

THE route to the East was the first of the Great Empire routes undertaken by Imperial Airways. Its extension to Australia, thereby making it the longest air line in the world, is now being achieved. As this book was being written, Major Brackley, Air Superintendent of Imperial Airways, brought the first Imperial Airways liner to rest at Port Darwin after a long flight according to schedule of 12,000 miles. Once again Imperial Airways has created another great link in Empire communications.

But along the route from England to India one discovers that, as usual, the R.A.F. were the real pioneers. This "Third Route", as Sir Philip Sassoon has named the airway to India (Vasco da Gama discovered the sea route in 1497; the Suez Canal shortened it in 1869; and in our time the aeroplane has discovered the sky route), saw R.A.F. machines flying across its deserts and dangerous seas before the big air liners attempted it.

Naturally, during the war, British and German machines were engaged in combat over Mesopotamia. They fought against one another over the ancient cities of Palestine. And when the Turk had been driven into Asia Minor, Britain, with its big commitments and mandates in the Middle East, discovered that the aeroplane was the most effective as well as the most economical method of policing these huge areas. Air surveys were made in the course of ordinary flying. The future airway to Bagdad and beyond was in the making.

Although R.A.F. machines had flown from Cairo to Bagdad and India as early as December 1918, the actual development of this route had to be carried out in two stages. The first was to be Cairo to Bagdad. The second was Bagdad to Karachi.

The Cairo to Bagdad section involved a desert crossing of over 500 miles, and the Persian Gulf section meant flying the rugged and inhospitable coast-line from the mouth of the Shatt-el-Arab to Karachi. This was a distance of 1200 miles over difficult country.

The necessity for an organized air route to connect Egypt with Iraq and India had long been realized by the military authorities, and at the end of the Great War in 1918 the presence of large air forces in Egypt and Iraq made it a practicable possibility.

The route first followed by R.A.F. machines between Cairo and Bagdad was by way of Damascus and Palmyra. But it was not until 1921, as a result of successful work by the R.A.F. ground and air survey parties carried out that year, that a proper air route was organized. Then it was possible to undertake safely the direct crossing of the desert from Amman in Transjordan to Bagdad. Landing-grounds were marked out every fifty miles along the route, and the track made by the cars of the ground survey party, being easily recognized and followed from the air, considerably reduced the risk of the pilots losing their way.

This route was first flown on June 23, 1921, when three D.H.9A's, accompanying the R.A.F. survey party, reached Bagdad from Amman. On July 28, 1921, the first consignment of official air mail left Bagdad for London, arriving on August 9. On October 8, 1921, the service air mail was thrown open to the public, and for the next six years was regularly operated by the Royal Air Force. When Imperial Airways began its great air service to India in 1927, it no longer became necessary for the R.A.F. to carry the mails; yet they have continued to be responsible for the upkeep of the desert route, and on some occasions in the past have been called upon to search for missing aircraft and to render assistance to aircraft stranded in the desert.

The first flight between Iraq and India took place in December 1918. Landing-grounds were prepared at intervals along the Persian coast by R.A.F. personnel, and the route then established is in regular use to-day by the French and Dutch air liners flying to India and the East. These same

aerodromes were also used for a time, until October, 1932, by Imperial Airways.

The blazing of this Persian coast route by the R.A.F. was carried out at a time when the Persian Government had little or no control in this part of Persia. Later the continued use of this route became dependent upon the good will of the Government at Teheran. Owing to numerous difficulties which began to arise it was decided in 1931 to proceed with the development of a route which would follow the Arabian shore of the Gulf, thus avoiding the necessity of using Persian territory.

For this purpose R.A.F. flying-boats were brought into use. They have been operating in the Persian Gulf since 1929, and have regularly used the Arabian coast route for flights to India. When Imperial Airways also decided to use this route and work it with land 'planes, several difficult problems arose.

Suitable sites for landing-grounds had to be selected and marked out along the Trucial Coast, and friendly relations established with the Trucial sheiks. Throughout the summer of 1932 R.A.F. flying-boats were used for reconnaissance of the coast-line and for conveying political officers on visits to the Trucial sheiks. Flights by R.A.F. land 'planes along the whole length of the Arabian coast of the Gulf were also carried out, with the result that much useful information on local flying conditions was obtained. As a result of these efforts it was possible to transfer the Imperial Airways route from the Persian coast to the Arabian side of the Gulf in October, 1932.

II

I have in another chapter of this book dealt at length with the political difficulties of the air treaty with Persia, for it has in many ways emphasized the difficulties of international air laws. But I now wish to describe some of the enormous advantages, both political and economic, which have accrued through the work of Imperial Airways in the Middle East.

It was in December 1926 that Imperial Airways began a weekly service between Cairo and Bagdad and Basra. It was at first intended to work in conjunction with the P. and O.

mail steamers, but difficulties again arose. The route was extended across the Mediterranean by means of flying-boats, Genoa being used at first as the port of departure. Then, when the African service was introduced and the Cape route organized, these two routes were joined and separate only at Cairo. One route goes south to the Cape; the other goes east to India.

This air route across the Middle East has also had an excellent effect upon the relations of the tribes. When the trans-desert air service was first established the tribes in the Syrian Desert looked with some suspicion upon it. It is now realized that the regular coming and going of aircraft, which does not in any way interfere with the local religious observances or politics, brings a new interest into the lives of these desert tribes. Incidentally the air liner has proved that it increases trade and does much to break down the distrust of the foreigner and establishes outposts of modern civilization.

Concurrently with the establishment of the trans-desert air route from Palestine to Iraq there seems to have been a noticeable improvement in the relationship not only between the tribes themselves, but also towards foreigners, and there appears to be no reason why the same improvement should not occur concurrently with the newly established Arabian coast air route, thus demonstrating once again that transport is civilization, and that the service is in no way detrimental to the interests of the countries flown over.

In many ways this new route down the Persian Gulf has an added interest for the air traveller.

Instead of the rugged mountainous nature of the northern shore the air journey down the picturesque Arabian coast is rendered specially interesting by the number of islands that are passed over and by the splendid vistas of sea and land provided by the fact that the big air liners fly along just off the coast for most of the way, thus ensuring for passengers the finest views of the ever-changing panoramas beneath their saloon windows.

By the previous line along the northern shore of the Gulf the air liners, after leaving Basra, flew to Bushire, Lingeh, and Jask, and thence *via* Gwadar to Karachi. Now, however, after ascending from the Shaibah aerodrome at Basra, they are



Photo by]

LEPA GREECE, FROM 3,500 FEET

[Author



Photo by]

[Author

NORTH OF CORFU



Photo by]

[Author

THE EX-KAISER'S PALACE, CORFU

steered towards Kowait, on the Arabian side of the Gulf, passing this seaport with its fine harbour—governed by a sheik who is on friendly terms with Britain—and continuing on down the coast, with its numerous islands, towards Behrein, the stretch of territory in this neighbourhood being under the control of the King of the Hedjaz.

At the island of Bahrein, the largest of the group under the protection of the Government of India, a halt is scheduled for lunch. These islands of the Arabian coast produce dates, and also a fine breed of donkeys, while on many of them are strange conical tombs, the origin of which is unknown, but which date back to very ancient times.

The halt at Bahrein, with its vineyards and wells, proves very interesting, the island being the centre of a large and valuable pearl-fishing industry in which more than 1000 boats are employed.

After lunch the flight continues over the low-lying peninsula of Qatar, and on via Yas Island to Sharjah, where the night will be spent in one of the completely equipped rest-houses provided for passengers on Imperial Airways services. Sharjah is under the control of a friendly sheik who has taken a keen interest in the passage of the air mail through his domain.

Next morning, after ascending, the scene changes from desert to mountain as one's air liner approaches the range running up the peninsula towards the Straït of Ormuz. A c is then steered through a pass between Sharjah and Di and thence via the Gulf of Oman and along the coast to Gwadar, in British Baluchistan, from which point the flight follows the previous route to Karachi.

But the desert route from Cairo to Bagdad, and then on to Basra, must be one of the great romantic air journeys in the world. It is a route I have not yet flown. I was one of the first passengers in that highly romantic motor service across the desert to Bagdad now known as the Nairn Transport. But I have yet to see this desert from above. It is a place on the map subject to sudden sandstorms, blinding in their intensity, and which only the big air liners can safely ride. Some of the exciting happenings on the desert route to Bagdad are told in the chapter devoted to the Royal Air Force.

The route from Bagdad to Palestine is now an international highway above and below, but my mind goes back to a chilly morning in December 1924—New Year's Eve to be precise—when, with three friends and two cars, I set forth on the journey.

We were unable to make for Damascus, for the Druses were out and distinctly truculent—so Jerusalem was our goal—and one piece of the track named the "Bay of Biscay" I shall not forget.

There was no half-way house in those days, and one steered by the sun and stars.

We started about 8 a.m., drove all day, all through an icy-cold night, and then through the following day—with but a few minutes for meals—until about 7 p.m., when the A.O.C. of the Middle East Command welcomed us at Amman with the traditional hospitality of the R.A.F.—never have a good hot bath, a cheery meal, and a comfortable bed been more welcome.

In the early days the pilots of Imperial Airways had a good glimpse of their route across the desert by this trail blazed by the motor-car. As Sir Philip Sassoon, one of the earliest air travellers of the Syrian Desert, admits, it became as easy to follow as Piccadilly.

In the archæological sense, the country is one of the most fascinating in the world over which to fly. This is the land of ancient civilizations, the country that saw Babylon in its splendour, and the desert over which rode Nebuchadnezzar in his chariot after he had defeated the Egyptians. Ruins of long-forgotten races, the marks of civilization in the sand, are often seen to better advantage and even discovered from the air. And when one comes in sight of the gleaming rivers, the Euphrates and the Tigris, then the droning aeroplane is indeed the brave new world saluting the old.

Bagdad, the city of the Caliphs, and where Haroun al-Raschid once adventured, is now the great air-port of the Middle East. "Iraq", writes Sir Philip Sassoon, "takes you by the throat the moment you enter it, saturated as it is with history and legend, religion and fable. I quickly began to understand the hold the country had taken upon Sir Percy Cox and Miss Gertrude Bell, and to sympathize with the devoted service they gave to Iraq and its people. . . . When the Third Route

to India which Imperial Airways has opened becomes more generally used; when land communications are improved by bridge and railway and proper hotel accommodation is provided in Iraq, as it is in Egypt, Bagdad must eventually become an immense tourist centre. Then it will be as thronged as are Cairo and Luxor by visitors drawn by the discoveries of the excavators, by the strange charm of an oriental city and the delights of a perfect winter climate. . . .

On the skyway to Basra the liners of Imperial Airways pass near some of the greatest archaeological work of our time, that of the Ur of the Chaldees, undertaken by the direction of Mr. Leonard Woolley. It may well be that those who are thrilled by these discoveries of Sumerian civilization at a time when the pessimists are predicting the end of our present civilization will soon be thronging the desert diggings and interesting themselves in the treasures turned over by the spade. And they cannot do better in time and comfort than use the airway to this desert of lost civilizations.

When Imperial Airways first started this desert air route towards India it used only De Havilland "Hercules" aircraft with three engines. These gave a great reserve of power as compared with paying load, and thereby obviated the danger of forced landings in the desert.

The first two machines were flown out to Cairo *via* Malta by Pilots Wolley Dod and Hinchliffe, in December 1931. Shortly afterwards Sir Samuel Hoare, then Secretary of State for Air, together with Lady Maud Hoare and Sir Christopher Bullock, Secretary of the Air Ministry, flew out in another machine *via* Malta and Aboukir. The pilot was Captain F. L. Barnard. At Aboukir the party was joined by Mr. Woods Humphery, then general manager of the Company, and proceeded to Karachi by the normal route—Gaza, Bagdad, Basra and Jask. On the flight from Egypt to India and back the pilot was Wolley Dod. The navigator throughout was Johnstone, who lost his life in the tragedy of the R 101. For these pioneer flights to India, Barnard, Wolley Dod and Johnstone each received the O.B.E.

The arrival of the first two "Hercules" aircraft at Heliopolis aerodrome, Cairo, was dramatic. Contrary winds and dust

storms had been encountered since their landfall on the north coast of Africa from Malta, wireless communication was not then so efficient, and it appeared doubtful to those awaiting their arrival that they could reach Cairo before dark.

Eventually the first to appear was descried in the eye of the sinking sun and landed at dusk. Then followed a period of anxiety concerning the other machine, because, apart from the difficulty of landing a large aeroplane in the dark on a strange aerodrome, there was a doubt as to the ability of the pilot to find the aerodrome at all. Suddenly the aircraft rushed into view with all cabin and navigation lamps gleaming and circled the aerodrome. Landing flares were quickly lighted. In spite of the inadequacy of night-landing arrangements the pilot made a perfect landing and came to rest opposite the hangars amidst the usual clouds of dust which are a feature of Oriental aerodromes.

Subsequently the Cairo-Karachi line operated with great regularity. Europe was at first connected with Africa by a service of Short "Calcutta" flying-boats, each with three engines. They operated between Genoa, Brindisi, Athens, Crete and Alexandria, or between Athens and Alexandria. The "Calcutta" flying-boats were subsequently superseded by the Short "Scipio" four-engined flying-boats of larger capacity and greater luxury. For a time these flying-boats for the India service used the Palestine coast. Then they were joined to the ^{air} service, and the one flying-boat route to Cairo across the Mediterranean now serves India and the Cape.

And now a man or a woman may leave Croydon on Saturday noon and on the following Friday, late in the afternoon, step out of the 'plane on Indian soil at Karachi. The distance is exactly 4847 miles, and has been accomplished in six days. That is the modern flying carpet which any Sinbad in London now finds at his disposal by Imperial Airways.

III

All the applause, so far, has gone to those lone, spectacular fliers, the record-breakers on the Australia route. And, of course, they deserve it. Hinkler, Mollison, Scott and others

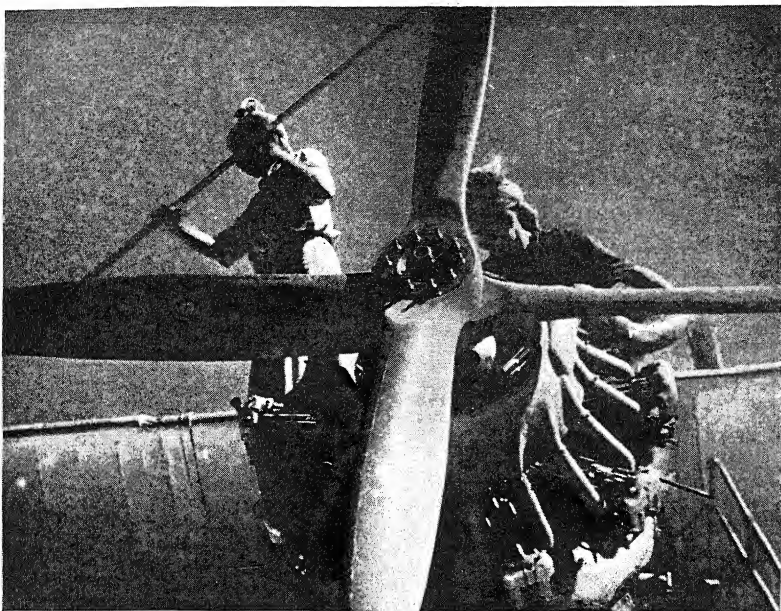


Photo by courtesy]

[British Instructional Films

KARACHI. NATIVE GROUND STAFF OVERHAULING THE ENGINE



Photo by courtesy]

[British Instructional Films

GALILEE



Photo by courtesy R.A.F.]

[Crown copyright reserved

ON THE WAY TO BAGHDAD
RUTBAH WELLS

who pioneered this route in fast light 'planes take chances which our airway company with a great safety record to its credit cannot possibly do. And the organization necessary, the ground work, the plans and the building of special air liners—all these things have to be thought and pondered in London by men who have a habit of shrinking from the lime-light.

Bert Hinkler surprised the world when, in 1928, he achieved the record flight from England to Australia in 15 days, 2 hours. This remained the record for some time. Incidentally, it also included the first non-stop flight London to Rome, the fastest England to India flight, and the longest solo air journey.

When Hinkler decided upon this solo flight to Australia he set off as unconcernedly as though he were flying to Paris and back. Those were the days when light aeroplanes were being fitted with folded wings. Hinkler showed that one man could act as pilot, mechanic and general handyman.

Now that Imperial Airways is considering this route to Australia they will be among the first to pay tribute to the work of the R.A.F. in pioneering the Calcutta-Singapore section. I have in my chapter of the R.A.F. described that magnificent flying-boat epic of the service when they flew from England to Singapore, thence to Australia, to Hong-Kong, and back to Singapore. That was in 1928, and was the first consistent British survey of the route.

During 1929 and 1930 the major portion of this Flying-Boat Squadron's time was spent on reconnoitring and developing the landing-grounds, moorings and other air facilities between Calcutta and Singapore. In 1929, four cruises were made along the route during the worst of the monsoon period, in order to gain experience of the difficulty of operating aircraft under the adverse weather conditions that exist at this time of the year.

By the end of 1930 the land-plane route was sufficiently developed for a flight of service aircraft from India to fly to Singapore. A month later a squadron of land 'planes which was to be permanently stationed in the Far East were built at Karachi and flown in formation along the Calcutta-Singapore route to their new station at Singapore. During 1931 and 1932 both the flying-boat and land-plane squadrons at Singapore

devoted a considerable portion of their energies to assisting and improving the facilities on this most important route.

Mr. S. M. Bruce, the Australian Prime Minister, made representations through the British Foreign Office to the Netherlands and Portuguese Governments for permission for Anglo-Australian aeroplanes to land on their territories in the East Indies. This permission was granted and a tentative arrangement made for the use of the efficient aerodromes already established by the Dutch aviation authorities for the use of the Royal Dutch East Indian Airways in the archipelago. The Australian Government immediately sent surveyors to Singapore to work out the route.

Imperial Airways has completed arrangements by which the Empire air mails to Karachi on the west coast of India will be flown across India to Calcutta and thence to Bangkok and Singapore by a local company. This service is operated jointly by Imperial Airways and an Indian company called Indian Transcontinental Airways Ltd. Its capital is subscribed jointly by the Government of India, Imperial Airways Ltd., and Indian National Airways, Ltd., another company which is established for the operation of feeder and other services in Northern India.

Imperial Airways and Indian Transcontinental Airways each provide one-half of the fleet required for the service. The fleets of the two companies are homogeneous and of modern type, carrying passengers and freight as well as mails. As large a proportion as reasonably possible of the personnel employed by Indian Transcontinental Airways are Indian, and this proportion is to be progressively increased as circumstances permit. Imperial Airways is arranging for the early training of a limited number of Indians in their commercial and engineering departments.

It is this company that will carry the mails from Karachi to Singapore.

Australia is another of those new countries apparently created for the new transport. Airways are essential to Australia,

and its sparse but energetic white population has realized this fact. It is a continent where the saving in time by aircraft can be measured in days, and in some cases weeks.

From the records I possess I find the latest civil aviation vote was £140,610. There are three subsidized routes operating, totalling 3490 miles. I wish space permitted me to describe the excellent work of these airways, for I have flown over some of them and realized that it is the best method of travel in the great Commonwealth. Aviation has been a tremendous boon to those lonely folk in the back blocks.

The Australian companies, too, have performed a useful service in undertaking special "taxi" flights to distant places. The conveyance of doctors to patients and the carriage of sick people unfit for ordinary travel to hospital has been specially valuable in assisting the settlement of remote areas. Stock breeders have also been saved large losses in times of drought, when the search for grazing-grounds has been successfully carried out by air in a fraction of the time that would otherwise be consumed. One of the greatest ambitions of the aerially minded Australians is the practical encirclement of the continent by regular services of aircraft, and, additionally, a link with Tasmania. And it may not be beyond the bounds of possibility that some day New Zealand will be linked to Australia by a giant seaplane service.

The Pacific is a mighty spacious ocean. It is all the more gratifying, therefore, to consider that Australian airmen were the first to conquer this waste of sea by a flight of 9263 miles, from San Francisco to Brisbane, accomplished in 83 hours, 35 minutes. This flight was accomplished by Sir C. E. Kingsford-Smith and a stout-hearted crew in one of the most famous aeroplanes of history—the *Southern Cross*.

For years Kingsford-Smith had dreamed of this great flight through the air of the uncharted, unflown Pacific Ocean. Another man was also dreaming of the same epic—Mr. G. F. P. Ulm. The time came when, both being employed by the same air transport company, they decided to join forces. How they scraped and begged and worked for the money necessary to buy their 'plane, how they finally acquired the *Southern Cross* and, just as they were about to begin, a series of financial

blows almost shattered the plans of the air adventurers preparing in San Francisco, has been told in their absorbingly interesting book, *The Great Trans-Pacific Flight*.

The *Southern Cross* was the combination of two Fokker monoplanes which Sir Hubert Wilkins used for his Arctic expedition of 1925. The two Fokkers were badly damaged in Alaska and were telescoped into one. Kingsford-Smith and Ulm further transformed this remarkable machine by installing three American Wright Whirlwind J5 engines, each developing 225 horse-power.

Months were spent over the plans by Kingsford-Smith. It was decided that the flight across the Pacific should be made in three stages. The first, one of 2400 miles, was from San Francisco to Honolulu. The second, the longest and most difficult, was the 3128 miles from Honolulu to Suva in Fiji. From Suva to Brisbane in Queensland was the final run of 1508 miles.

On May 31, 1928, they set out from San Francisco. The *Southern Cross* carried Kingsford-Smith as first pilot, C. T. P. Olt as second pilot, J. Warner, wireless operator, and H. Lyon, Jr., as navigator. They looked down at nine o'clock that morning and saw the streets of the city slide away. It was the last land they were to see for many long hours. Over 2000 miles of sea lay before them.

Weather conditions were fairly favourable for that first hop, but the night was long, and the weary vigil of men watching instruments went on through the hours of darkness. The dawn came and still the endless Pacific beneath them. It was not until eleven o'clock that they glimpsed the snow-covered summit of the 13,000-foot peak of Mauna Kea. At 12.17 they swooped over the crowded and cheering streets of Honolulu and came to earth.

The next stage of the flight was the longest one—3128 miles to Fiji Islands. They had to take their machine to an adjoining island of the Hawaiian group in order to find a beach where they could take off with the heavy load of fuel necessary for such a flight. At a quarter past five on June 3 the *Southern Cross* took the air and slowly climbed to an altitude of 350 feet in eight minutes. Only superb piloting saved the craft from disaster.

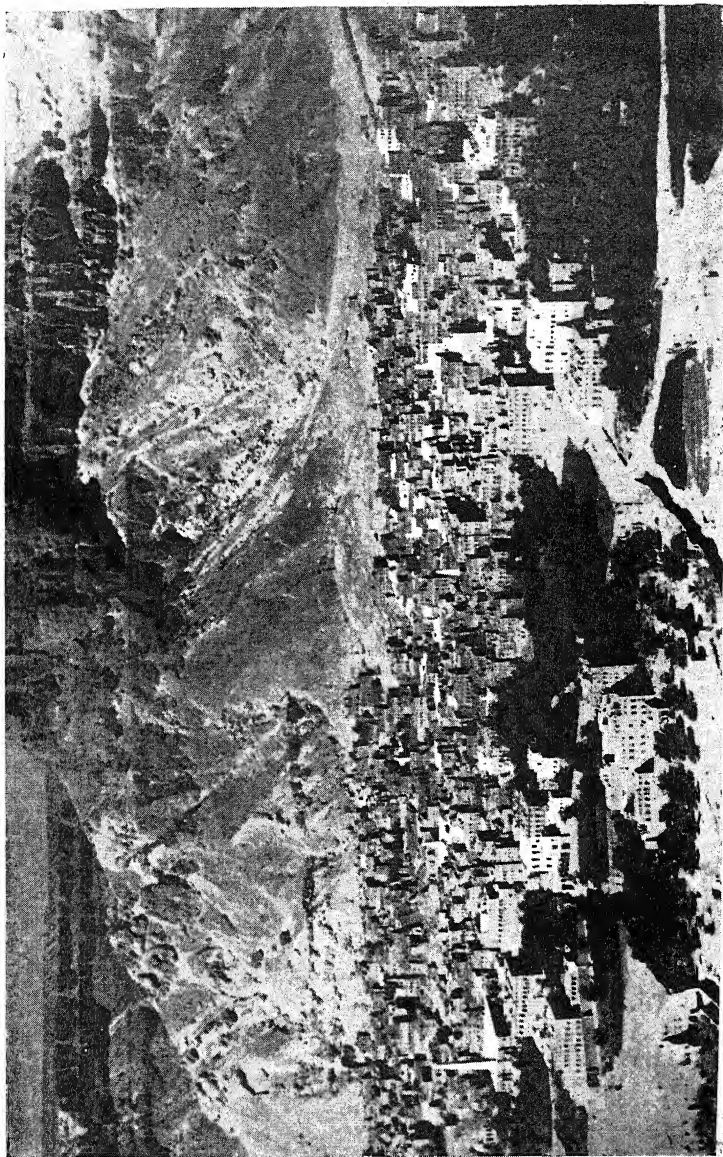


Photo by courtesy R.A.F.]

[Crown copyright reserved]

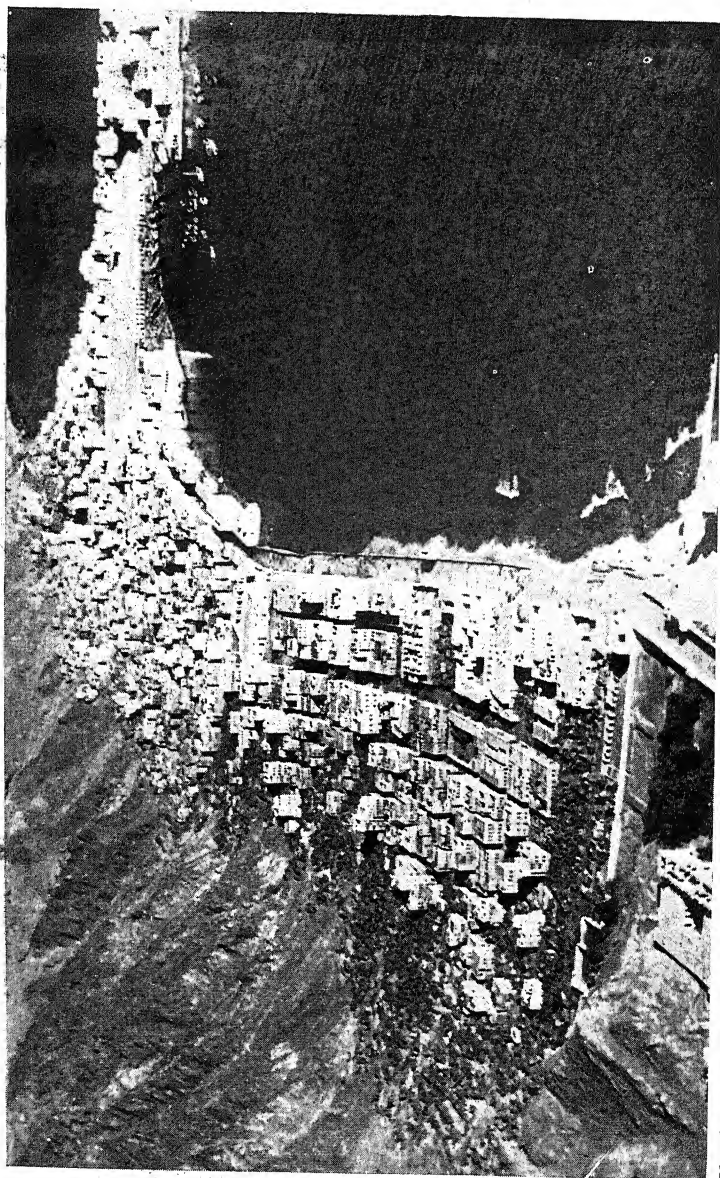


Photo by courtesy R.A.F.]

OVER THE ARABIAN COAST. MUKALLA, LOOKING EAST

[Copyright reserved]

Accidents came soon. A compass went out of action. Then came bad weather. Tropical rainstorms. The radio failed. It took some time to get it fixed again. But all the time the *Southern Cross* was heading across the waste of ocean. They met heavy clouds. The machine had to be lifted to a height of 8000 feet before they were clear of them. And the cost in petrol consumption was heavy. Every gallon counted on this long flight.

At 11.30 p.m. they crossed the Equator. The night passed fairly quietly. But just before 6 a.m. a terrific storm of rain and lightning appeared on the horizon. Its summit seemed at least 12,000 feet above the sea, and long before they reached its neighbourhood mighty bumps shook the 'plane. But they came through into a dawn of cloud and heavy rainstorms. A head wind was delaying them. Petrol began to go dangerously low. But at 1.10 p.m., rising dome-like from the misty ocean, appeared Fiji, about 70 miles away on the starboard bow.

At 3.40 p.m. they came in over Suva and, with a magnificent piece of piloting by Kingsford-Smith, landed in a small and extremely difficult aerodrome, to the applause of the assembled crowd. They had been in the air 34 hours 23 minutes from their last departure point—the Hawaiian Islands.

At 2.52 p.m. on June 8 the final stage of the flight to Australia was begun. The *Southern Cross* took off wonderfully well from the sands of the island and the pilot headed the 'plane for Brisbane. As the sun set they came into colder climes, and incidentally bad weather. A series of heavy bumps shook the 'plane badly. Ahead appeared rushing walls of black cloud, and then came heavy rainstorms of increasing frequency.

Flying became blind. To the pilot's straining eyes it appeared as though the craft were being driven through a torrent of water. Vainly did they climb to escape those terrible conditions. They went up nearly two miles. The weather grew even worse. Sudden upward currents lifted the craft hundreds of feet, while downward swoops whirled it a thousand feet towards the sea. It was one long ordeal for the men of the *Southern Cross*.

Dawn found them still flying through cloud and rain, but slightly better conditions. At 9.50 a.m. there appeared above

the horizon a long low line of land—Australia! This historic flight was safely concluded at 10.50 a.m., June 9, when Kingsford-Smith manoeuvred the plane to earth at Eagle Farm Aerodrome, Brisbane, 20 hours and 58 minutes after leaving Suva. One would have imagined after such a flight that Kingsford-Smith would have been content both with his own performance and that of the *Southern Cross*. He was, however, only beginning. He decided upon a trip from Melbourne to Perth and back, roughly 2000 miles each way. With a change of wireless operator and navigator, the non-stop flight between these Australian cities was successfully accomplished.

Once again Kingsford-Smith looked at the map and his eye fell on New Zealand and Tasmania. The *Southern Cross* was overhauled, and then blazed the first aerial trail across the Tasman Sea. Helped enormously by the wind, they actually accomplished the 1425 miles at an average speed of 102 miles an hour. The air trip back, however, took 22 hours.

It was after this feat that Kingsford-Smith decided to attempt to reduce the record flight to England set up by Bert Hinkler, who took 15 days on a solo flight.

The first attempt ended in disaster. The *Southern Cross* was forced down in the Australian bush on the way to Port Darwin. The machine had flown 2240 miles, when the petrol gave out, and Kingsford-Smith had to make a landing in that lonely, desolate bush. It was twelve days before the aviators were discovered by a search party and rescue accomplished.

Nothing daunted, they set off again. Leaving on June 25, Kingsford-Smith landed the *Southern Cross* at Croydon on July 10, having accomplished the long and trying journey in an hour under thirteen days, thus beating Hinkler's record by more than two days.

Even then Kingsford-Smith was not content. He determined to go across the Atlantic and to make a real round-the-world flight by landing at San Francisco, where he first set out upon his epic Pacific flight.

On June 24, 1930, the *Southern Cross* took off from Portmarnock, near Dublin, and entered upon the stormy, fog-bound Atlantic airway. Once again the gods were with the pilot and his companions. They reached Harbour Grace,

Newfoundland, in thirty-one and a half hours. From this flying time there should be deducted ten hours, during which time they were vainly groping through the fog to discover a landing-place. Later they flew to New York and finally to San Francisco, where the much-tired and weathered *Southern Cross* found a resting-place.

So long as Australia produces such magnificent airmen there need be no fears as to the ultimate success of the air route from England to Australia.

[Since these last words were written Kingsford-Smith on a Percival Gull has once again eclipsed the record with a lone flight.]

V

When preparations for the Imperial Press Conference of 1925 were being made, Great Britain, at the request of our Australian hosts, did a certain amount of liaison work throughout the rest of the Empire.

A small Arrangements Committee, of which I was appointed chairman, was formed, and among our tasks was that of obtaining and submitting to Melbourne the various subjects for discussion. It seemed to me that at this gathering of the leading men of the Empire Press, assembling for the first time as the guests of the newspapers as well as of the State and Federal Governments of Australia, a great opportunity was afforded to emphasize the growing importance of air communications; and so I ventured to select as my own particular subject that of "An Inter-Empire Air Policy".

On more than one occasion I had raised the subject in the House of Commons, and, like a good many other people, showed signs of impatience when I thought I saw other nations getting ahead. In preparing my data it is only fair to acknowledge the kindly help I received, as ever, from the Air Ministry, as well as that from my good friend Sir Samuel Hoare, then Secretary of State. Since the Ministry was formed there have been a series of excellent representatives in the House of Commons, but never one keener or more competent than Sam Hoare. He loved his job, which he did supremely well and assuredly

blazed that ministerial trail by air which his distinguished successors—and other Ministers—have so eagerly followed.

In Melbourne we were greeted by the Governor-General, the Prime Minister, and the Chairman of the Australian Branch of the Empire Press Union (our kindly and hospitable hosts), and under the Presidency of Lord Burnham the Conference began.

My resolution on the Air was as follows :

“That this Conference, fully conscious of the importance of improving and facilitating inter-Empire communications, views with sympathy the efforts now being made for linking up by air the different sections of the British Empire.”

To which Lord Apsley, with my hearty approval, added these words :

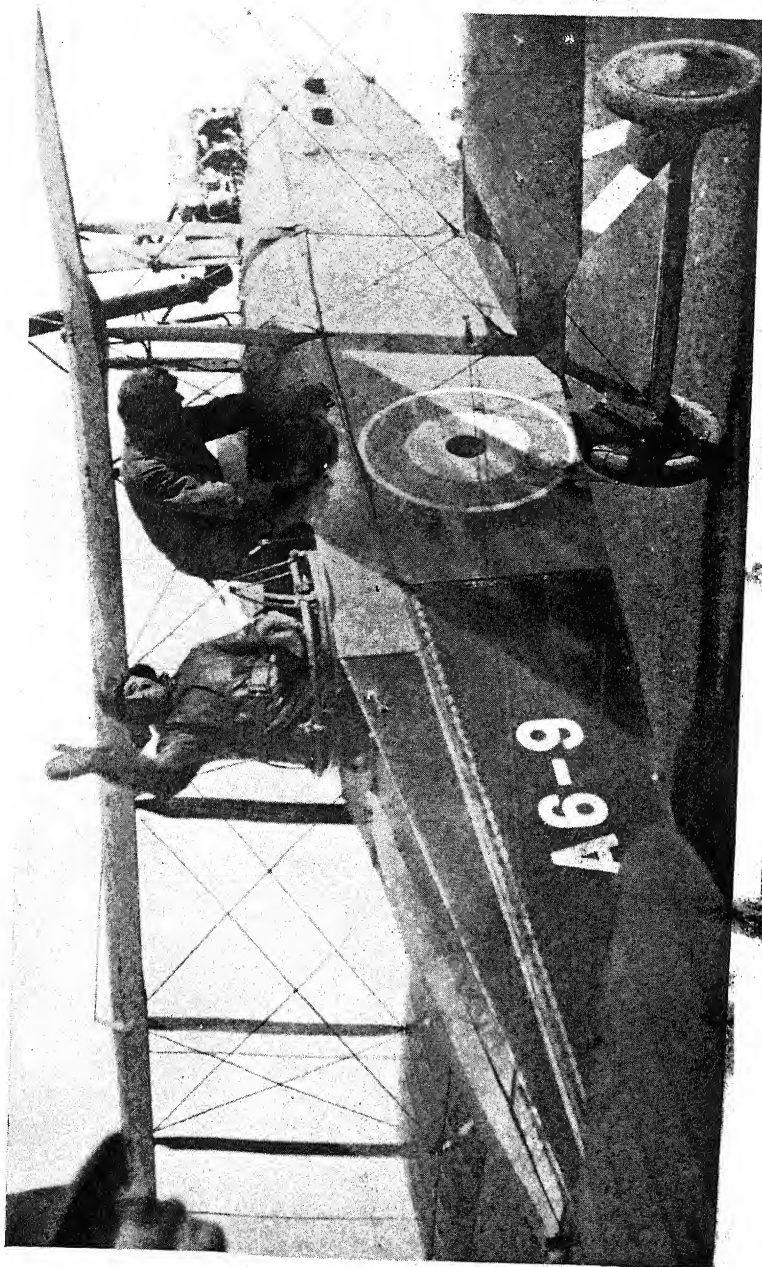
“And urges the utmost development of all the available Imperial Air Resources for that purpose.”

A most interesting discussion took place and many excellent suggestions were made, resulting in unanimous agreement. This debate was followed, as I hoped would be the case, with wholehearted support throughout the Press of the Commonwealth.

While in Melbourne, I was the guest of Lord Stradbroke at Government House, and at dinner that evening the subject of the Air Debate cropped up. I ventured to suggest to the Governor that (on the lines of “practise what you preach”) it might be a good thing if, following my talk, I took a turn by air from Victoria instead of going with the main body for the two-day tour by the Resources (Reso) Train. My host at once agreed, and got in touch with the Commandant at Point Cook. The latter heartily supported the idea, and off I went at cock-crow the next morning, accompanied by the Governor's A.D.C.

Point Cook, where is the aerodrome, lies some fifteen miles from Melbourne ; it is in an excellent position on the coast so that seaplanes can also be accommodated.

Flight-Commander T. Swinburne and Flying Officer



AUTHOR LEAVING ECHUCA, NEW SOUTH WALES

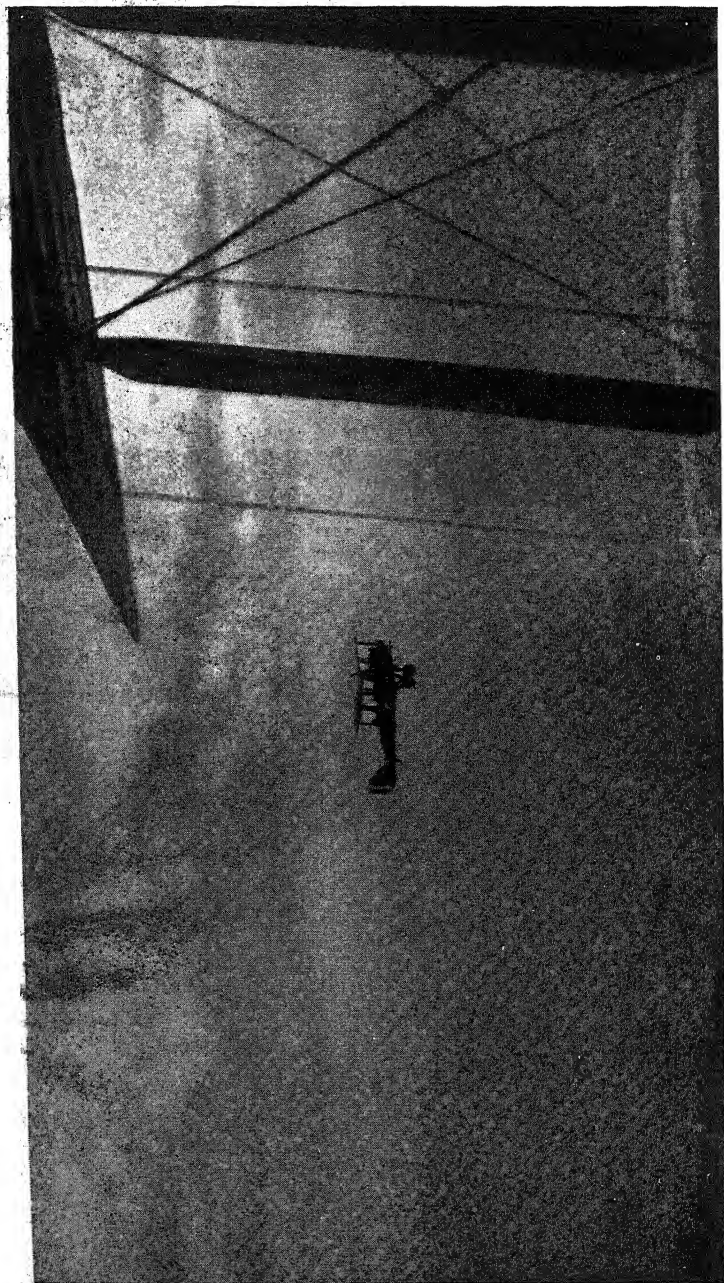


Photo by

FLYING IN AUSTRALIA, OVER THE MOUNTAINS OF VICTORIA

[Author]

B. E. Wilson met us at the little air village and introduced us to the officers in the mess. It was still grey and raining—an unpropitious morning for a flight round the State; and a telegram was sent to Echuca, on the borders of New South Wales, to say that the chances were against our being able to pay their town a visit. We decided in any case to have a run along the coast for some distance, and then, if it did not clear up, back for lunch.

The two machines which were to accommodate the A.D.C. and myself were D.H.9 two-seaters—reconditioned English gift machines. Wilson and I led off in the first place and were soon away westward in the grey clouds.

After we had travelled westward for about a dozen miles, and at about 3000 to 4000 feet, we saw to our great joy a tiny blue speck above the horizon, and made straight for it. The little circle of blue gradually enlarged as we got nearer, and at length we came out into glorious sunshine, when my pilot, with a smile, turned round and, pointing to a neat little town below, shouted, "Geelong!"

Geelong looked well from the air—tidy and correct and nestling round her little harbour with the broad ocean stretching away along the coast-line which now appeared behind the clouds. We were now in for a good day with the murky weather receding into the past.

Over the mountains there were a few white fleecy clouds which only added to the beauty of the spreading landscape as we flew westward to Lake Coranganite, turning later to the north over fine country with huge stations made up of great fields of green and carrying sheep by the thousand, the whole landscape as clear as crystal from the air.

From flat open country we came to rolling uplands and then the city of Ararat! Why Ararat? Anyway, Ararat is delightfully situated amidst the mountains, which we then crossed, rising up a couple of thousand feet, and dodging one of the fleecy clouds as we sailed over. The scenery here was beautiful, a long ridge of hills stretching across the country as far as one could see, and right ahead a wonderfully rich irrigated land with fine stations, each with its big house and sheep galore.

An irrigation scheme is well grasped from the air—one follows it from the broad canals to where the last little trickle flows.

One orchard after another came into view, cleanly and carefully kept, the blossom on the trees standing out as a blaze of white on the rich dark soil.

We passed over Bendigo, a big mining town, the aerial view of which is not improved by great dumps on all sides and rubbish heaps from the mines. North-east of Bendigo was a wide-spreading district very like an English park on a huge scale. It was a fine attractive country with a more settled appearance than any I had seen in Australia.

When we came to anything of interest my pilot would spiral down for a turn or two so that I could get the view burnt in.

It was now about 1.15 p.m. as we flew over Elmore, and after our very early breakfast at 7.45 a.m. the pangs of hunger were beginning to assert themselves, so I was glad to hear the shout of New South Wales and to see ahead the dividing river and Echuca nestling in the trees—for here we were to lunch. Two circles we made round Echuca, and then came down, making a perfect landing in the aerodrome field (not that there is any dome, but plenty of field), the second plane closely following.

Many citizens in cars came pouring out of Echuca, and to meet us in the field was the mayor and his daughter and other Echuca worthies. They rushed up to our 'plane, accompanied by the inevitable photographers, who took the 'plane and then a group or two.

The mayor—Mr. J. Simmie—presented a leading wool gentleman whose name I have forgotten, but who damped my spirits by saying, "Now, Sir Harry, I should like to take you with me to see a little wool unloaded." I ventured to add that "I should like to take part in the loading of a little lamb or mutton first". The mayor broke in with, "But I thought you had lunched, the telegram from the A.D.C. having said 'No lunch'." Alas for the schemes of men! What he had been asked to say was, "No speeches at lunch"—but the middle had dropped out!

TO INDIA AND AUSTRALIA 129

However, the excellent Echucans were all for filling that void with full despatch, and Miss Simmie ran me into the little hotel, where we soon had things going, and were followed by the pilot and Bircham, who remained to fill up the petrol tanks. How good that lunch tasted at two-thirty!

As we were to go on at about 3.30 p.m., Miss Simmie ran me round the little town, up to the tennis courts, along the river and down Echuca's shopping street. Lots of friends came to see us off, and quite a cheer rose from the ground with us as we left the hospitable little spot behind.

Our return journey—equally delightful—lay over the eastern side of the State as easterly as we could go consistent with arrival at sundown.

Just as the full glory of the setting sun splashed a wonderful orange glow over the homes of Melbourne we returned on the western side of the city, and the panorama was one not to forget. Banks of clouds to the west were again jumping on the far side of the city and created a weird blood-red background to the deep yellow reflected from Melbourne's roofs.

Our remaining fifteen miles passed in a flash, and with a couple of circles down we ran over the aerodrome, found a perfect landing and taxied up to our hangar, after a truly excellent day and one in which I had seen more and got a better view and understanding of Victoria than if I had travelled on its surface for very many days.

Our hosts of the aerodrome would not hear of our returning for dinner, but insisted upon our joining them, and so a message was sent to Government House, and Wing-Commander Williams and the R.A.A.F. took us in charge. They were all delighted with my flight round Victoria, which they said was just what was wanted, after my speech at the Conference on Air Communications, to drive a point or two home, preaching and practising alike, and the trip was well followed up in the Press.

An interesting relic at the aerodrome is Smith's propeller from the machine in which he made the historic journey from England.

It is impossible, in this chapter on aviation under the Southern Cross, not to mention the quiet but very effective work done in New Zealand. Here is a Dominion apt to shun anything in the nature of blatant publicity, but it is very necessary to call attention to its air development.

Both civil and military aviation in New Zealand to-day are controlled by the Minister for Defence for the time being. During the war many New Zealanders held their own as pilots and a number distinguished themselves, notably Alfred de Bathe Brandon, who brought down the first German Zeppelin in England. A number of young men from New Zealand made history for their country during the war-time, especially a certain flying genius who is referred to in that great book *War Birds*. After it had been decided to make an Air Arm for the defence of the country, the Government of the day separated the vote for Aviation from that of the Navy and Land Forces, and the Air Force had a budget for itself for the first time. Flying men from New Zealand who came to be trained in England returned, highly recommended and qualified, to take charge of the bases at Sockburn and Hobsonville, the former the principal aerodrome of the South Island and the latter the North Island's principal base.

To the Hon. Sir Henry Wigram belongs the honour of the position of the Air Force as it is to-day in New Zealand. In and out of season, though he has reached a very great age, he pleaded for the assistance of the Government in the development of the very necessary arm of defence. He handed over valuable properties in Canterbury for the establishment of the Sockburn aerodrome, and has recently given a further block of land adjoining the aerodrome for the extension of operations there.

To-day there are many aerodromes and landing-places in New Zealand. The object was to have a chain of landing-places starting from Wellington northwards in the shape of the Prince of Wales's feathers, the main feather running up the centre of the Island to Auckland, the left feather along the west coast to New Plymouth, and the right feather running

up the east coast to Gisborne. This scheme is well on towards completion. The first Act of Parliament giving local authorities the right under certain conditions to prepare landing-places for aircraft and to spend money on such works passed into law in 1929.

There is no difficulty in getting volunteers for flying in New Zealand. On one occasion when two were wanted at Sockburn, 463 applications were received. There are many New Zealand flying-men in the Royal Air Force, and some have gained high places. There is a very daring pilot in the Dominion to whom I have referred previously. He has flown a machine under the Waikato Bridge, and his "stunt" work is famous. On one occasion he took up for a short flight a farmer who had been celebrating with some friends not wisely but too well, in order that he might see his farm from the air, and when he was coming down he gave him a turn or two not quite in the original programme. When he landed the farmer said to the pilot, "It's all right, but there is only one coil of wire on my place, and I saw seven."

CHAPTER VI

THE AFRICAN ROUTE

I

THE inauguration of the regular air-route to the Cape is, without a doubt, the finest achievement at present to the credit of Imperial Airways. Its skilful pilots with their giant machines have accomplished something which even that great visionary, Cecil Rhodes, had not imagined. Rhodes dreamt of an all-red railway route to the Cape. Imperial Airways have created an all-red skyway to the Cape.

A through weekly service between London and Cape Town was officially begun on January 20, 1932. That date may well be regarded as a red-letter day in Empire communications. The 6000-miles seaway between London and Cape Town is a matter of seventeen days by mail steamer. Imperial Airways proposed to reduce it to ten and a half days, although the skyway was one of 8000 miles. This was the maximum. Faster machines and improved groundwork will most certainly reduce this time period.

The grandiose imagination of Rhodes would have leaped to the possibilities of this all-red skyway down Africa. It is linking together the various African colonies, protectorates, and dominions in a fashion that no amount of speechmaking, of pamphleteering and Albert Hall rallies could possibly achieve. Through the African skyway, Africa is becoming continent-conscious.

Rhodes realized the necessity for Africa to avoid the acute national divisions of Europe. There was a British Africa, from north to south, that needed a co-ordinating consciousness. Rhodes believed that a railway would accomplish that, and in so far as it meant rapid communications, he was right. But the railway was never completed, and an innate suburbanism seemed to have affected British Africa from north to south.

Rhodes died without having achieved his vision, but, master builder as he was, the idea persisted.

In the gardens of Cape Town there is a statue of Cecil Rhodes. He stands with his hand raised, and his message engraved on the base of the statue: "Your hinterland lies north." Although that message was there for all South Africa to read, it was not until another great visionary, General Jan Smuts, called upon South Africa to look north, and began to talk tentatively of a great federation to be known as the United States of Africa, that the people of the Union began to see the spaciousness of their continent.

Each Sunday, as the Imperial Airways machine wings its way to the aerodrome at Cape Town, many South Africans are looking northward. Among the Dutch South Africans these giant machines are reviving the spirit of the old voortrekkers, the men who laboured with their ox-waggons to the distant horizon. And it is significant that among the pilots of these giant machines that fly across the veld are young South African pilots, filled with the new vision of the men who sit like gods among the clouds.

At Khartoum, in the Sudan, where General Gordon once waited helplessly for news that came too late, Britishers are now in rapid communication with London. In the Grand Hotel, which looks upon the Nile, English exiles may read their newspapers and the activities of London life within a few days of their happening. It may seem a small thing; but only those who have lived in exile know the craving for the chit-chat of London life. What is du Maurier's or Gladys Cooper's latest play? Has Hammond achieved a new record for Gloucestershire? What are the latest engagements of the social season? The telegraph may briefly report these in staccato language. But it is the newspaper that gives reality to them.

Letters and newspapers are rapidly carried to the outposts of Africa by Imperial Airways. Also passengers. Somewhere along the route descends a man back from leave with the freshness of England unmistakably upon him. He takes up the old routine of life, reoccupies the old bungalow, goes round to the old familiar club. But so swift has been his passage from London that the undefinable "home" atmosphere has

not yet worn away. How different when the man on leave came back by steamer through the Suez Canal! Who has not seen that subtle change begin to work as soon as the steamer stayed for an hour or two at Port Said for coaling? A man may enter the store of Simon Artz still a Londoner. He often comes out the unmistakable District Officer complete with sun-helmet and liver-salt. Flying back to exile gives him a better chance. And the administration of the Empire in Africa benefits considerably by such rapid communication.

Uganda and Tanganyika, with their white settlements once isolated by many weeks from London, are now brought within a few days of the Empire's capital. A trivial affair of administration that might have led to months of correspondence can now be settled within a week. If ever there should occur one of those exciting incidents that happen in an African outpost and have been known to overthrow a Government in London, the sequel to-day might not be so sensational. An awkward question might be asked in the House of Commons regarding Uganda. It is to-day possible for a Minister or some responsible Under-Secretary to fly by Imperial Airways to this outpost and be back in his seat in Parliament with correct information within a matter of days. Perhaps, in the near future, we may see it happen.

Kenya has already benefited considerably from this African skyway. The land that the popular novelists once termed "the edge of beyond" is now within a few days of Cairo. It might have seemed fantastic to suggest, a few years ago, to a business man in London that it would do him good to spend a few days shooting in Kenya. Yet to-day a man might well possess a shooting-box in Central Africa and reach it as easily and as quickly as he could have done a shooting-box in Scotland a century ago. It is not without the bounds of possibility that the Uganda Game Reserve may become as popular with zoologists and zoo gossip-writers as Whipsnade.

Kenya has definitely become air-minded. There was a time when old pioneers sneered at the settler who insisted upon possessing a motor-car. Nowadays there are several settlers who insist upon possessing aeroplanes. These African highlands, with their immense tablelands and distant blue horizons, are

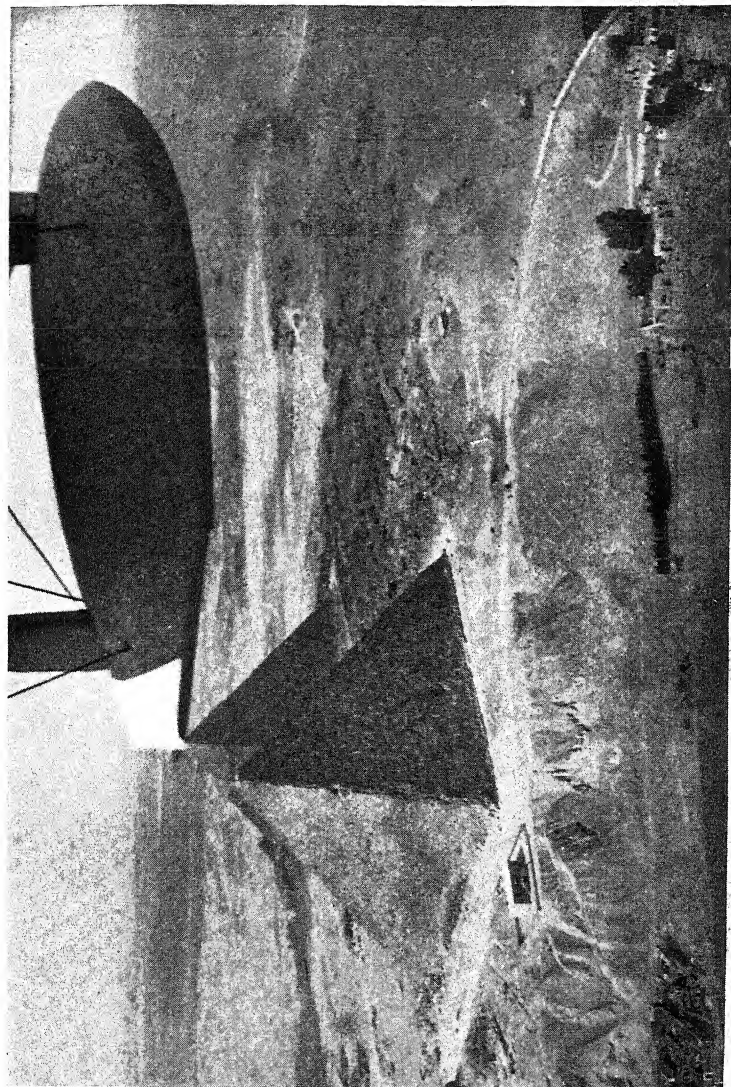


Photo by courtesy

FLYING BOAT OVER THE PYRAMIDS

[Imperial Airways]

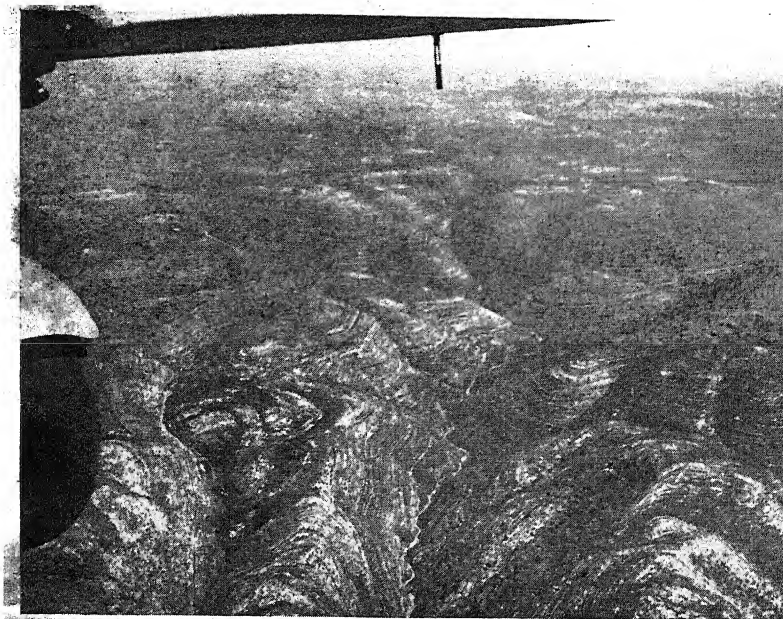


Photo by courtesy]

[Imperial Airways

PALESTINE, THE WILDERNESS ROUND JUDEA

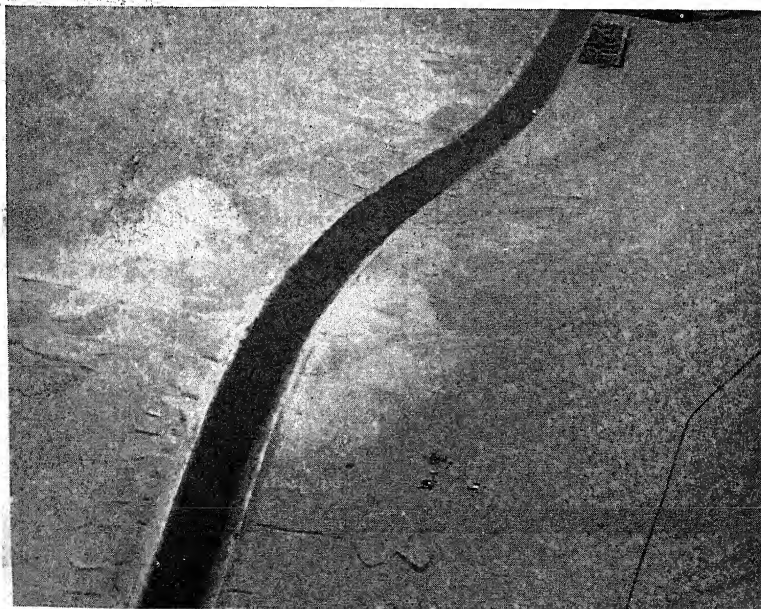


Photo by courtesy]

[Imperial Airways

AN AERIAL VIEW OF THE SUEZ CANAL

a lure to the airman as the sound of surf is to the sailor. The regular arrival of the Imperial Airways machine at Nairobi is a constant reminder that this one-time outpost is now almost a suburb of London.

Both Northern and Southern Rhodesia have welcomed the advent of Imperial Airways with enthusiasm. It has a political significance for them which is, perhaps, not fully realized in England. The two Rhodesias have been the most consciously British settlements in Africa. Rightly or wrongly, they refused to lose their independence by joining the Union of South Africa. These Rhodesias have kept the spirit of Rhodes alive in Africa when others have forgotten the master builder.

The linking of the British African territories by Imperial Airways has synchronized with the growing desire for federation of the East African territories. Without that air link federation will be extremely difficult of accomplishment. It is not merely true to say that trade follows the aeroplane to-day. Politics are on the wings. Rapid communication between Uganda, Kenya, Nyassaland, Tanganyika and the Rhodesias may easily sweep away frontier lines and alter the map of Africa.

These are only a few of the glimpses that a man seated in an aeroplane and flying down the African skyway may see before him. Perhaps some of them are storm clouds, dust devils, or locust swarms ready to sweep down on man and machine and send him to destruction. But, for better or worse, the men, the machines and the ideas will persist. Africa, with its black population, proving itself still the most virile continent in the world, will adjust itself to the new ways. And the engine roaring above will not only be tearing through the sky, it will also be tearing through the map of carefully designed political boundaries.

II

When the pilot of the Imperial Airways machine took his place in the cockpit on December 9, 1931, and soared aloft from Croydon aerodrome with the first Christmas air mail for the Cape he must have given a fleeting thought to the pioneer aviators who had helped to blaze this new air trail.

The air route to the Cape has had a fascination for airmen similar to that which the sea route had for sailors at the time of Vasco da Gama. And those sailors who voyaged in small ships through strange seas really hazarded less than the airmen in frail craft who battled through unknown skies. The pioneer airmen of Africa's skyways deserve to have their achievements set down by some modern Hakluyt.

The Cairo-to-Cape air route was originally surveyed in 1919. A good deal of sky and ground work was performed in the usual efficient but silent fashion by the Royal Air Force. The route was declared open by the Air Ministry that same year. Almost at once five aeroplanes set off to achieve the distinction of being the first machine to accomplish the journey from London to the Cape. But not one of those machines reached its goal. And of the many airmen engaged in this desperate adventure, only two reached Cape Town by air. They were Lieutenant-Colonel Van Ryneveld, D.S.O., M.C., and Flight-Lieutenant Quintin Brand. Flying together, they wrecked two machines en route. In a third they reached the end of the Dark Continent after a journey that had taken them 46 days.

These two men are the real pioneers of the African skyway as Alcock and Brown are of the Atlantic and the Ross Smith brothers of the Australian route. They deserve more than a passing mention, as they are both alive to-day. Sir Pierre Van Ryneveld is now Chief of the Union General Staff. And those who are pessimistic enough to believe that an aviator is always tempting death when he leaves the ground may be interested to know that Sir Pierre has flown nearly every day for ten years, and is as sanguine and as cheery as ever. He was prominent among those who greeted the arrival of the first Imperial Airways machine at Pretoria.

At the time of this great pioneer flight, Van Ryneveld had a spectacular reputation for air exploits. At 25 years of age he had seen service in Egypt, France, Palestine and Salonica. He had been mentioned six times in despatches. He was awarded the Order of Leopold of Belgium, the Croix de Guerre and Legion of Honour.

Van Ryneveld's companion, Flight-Lieutenant Brand, was 27 at the time of the flight. He also was a South African with

an exceptional war record to his credit. He had been mentioned in despatches and gained the D.S.O., M.C., and D.F.C. One of his brilliant feats was towards the end of the war, when he attacked and destroyed a German Gotha in one of those desperate raids over England. When the epic flight to the Cape had been completed, Sir Quintin Brand returned to England and the R.A.F. He is now a Wing-Commander in a distant part of the Empire.

The machine that these two men raced across the Brooklands aerodrome on February 4, 1920, had been specially constructed by Messrs. Vickers. It was named the *Silver Queen*. Very soon the usual troubles that dogged those early aviators came upon them. A leaking radiator was their first concern. It had to be taken down and soldered. While flying over mountains in Italy the machine behaved in an unaccountable manner. It would pitch down 600 feet without warning, and only the skill of the pilot saved them from crashing.

Europe had its difficulties for these two aviators! Perhaps their worst experience came when they were bridging the two continents—Europe and Africa. Nowadays the flying-boats of the Imperial Airways cross the Mediterranean in a few hours in comfort and security. Van Ryneveld and Brand had a night-mare experience over this historic sea.

They decided to attempt a night flight over the Mediterranean—a reckless decision in those days; but there was a reason for it. These young South Africans were attempting to beat a machine, a huge Vickers-Vimy, that was already well on its way down the African skyway. Of this Vickers-Vimy I will relate a story anon. I only mention it here to explain the apparent impatience of these aviators to fly that treacherous Mediterranean in the night.

They set off from Gioja del Colle at 9.30 p.m. Their immediate object was Sollum, on the African coast. Very soon they realized that there was bad weather ahead. The darkness seemed torn by wind and rain. Beneath them the Mediterranean was whipped with spume, and already both men were tiring in the effort to keep their machine steady and prevent themselves from being forced into the sea.

Van Ryneveld has confessed that sleep began to creep upon

that he had to strike himself in the face with gloves to keep alive. Brand was also drowsing. Van Ryneveld flashed an electric torch again and again in the drooping eyes of his companion. At four o'clock in the morning the pilots wearily changed places. Their eyes searched the sky for a break in the storm clouds, some suggestion of grey light that would tell of the dawn at hand. It was Van Ryneveld, red-rimmed at the eyes for want of sleep, who suddenly discovered that their petrol was diminishing. And still there was only that awful darkness.

At long last the dawn they waited for appeared. Sunlight began to gild the heavy clouds. Their engines still roared triumphantly, and the pilots decided to dive through that misty floor and find the Africa that they had sought all night. With the whine of wind against struts they went down. The mist of cloud swirled about them. Then they saw the sea, rough and surf-smothered, leaping towards them. Not a sign of land. A yell of warning, and they swung the *Silver Queen* skywards again.

The nose of the engine still pointed to the south. It was obvious that they must sight land sooner or later. Yet they flew for another hour and a half before the wind-swept sea gave way to the brown haze of North Africa. The *Silver Queen* with its two haggard pilots lurched to the ground in the desert at Derna. It was 8.30 in the morning. An hour later they were at Solh.

But this was only the beginning of a flight of incredible adventures. The *Silver Queen* reached Cairo at eight o'clock in the evening of February 9. Two days later they left Cairo at night and flew southwards. The Cairo-to-Cape flight had begun. But the story of the adventures of Van Ryneveld and Brand would need a book to itself. Not far from Cairo engine trouble compelled them to make a forced landing, and their machine was damaged beyond repair. Some weeks later their engines were transferred to another machine, and they resumed the flight from Cairo. *Silver Queen II* most unluckily crashed near Bulawayo, on March 5, and was replaced by a third machine called the *Voortrekker*, provided by the Union Government. In this third aeroplane the two determined aviators reached



Photo by]

[Author

DODOMA AERODROME
BABOON AND MONKEY KEPT ON THE SPOT TO GIVE WARNING WHEN
LIONS OR LEOPARDS ARE TRESPASSING ON THE AERODROME



Photo by]

[Author

CAPT. ALCOCK WITH LADY BANDON AND MRS. CUMMING AT
WADY HALFA



Photo by]

[Author

SHIPPING AT KISUMU
THIS PORT IS 3,750 FEET ABOVE SEA LEVEL

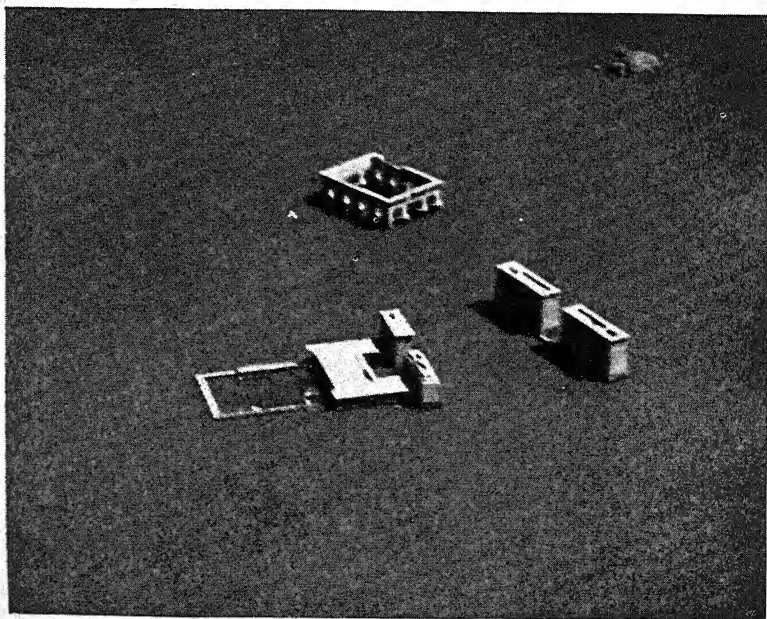


Photo by]

[Author

THE SUBMERGED TEMPLE OF PHILAE

Cape Town on March 20. As their machine droned over Table Mountain, the mother city of South Africa went frenzied with joy. The flight, including interruptions, had taken a little over six weeks. Both the aviators were knighted, and Sir Pierre Van Ryneveld is still Director of the South African Air Service.

And now that Imperial Airways machines carry regular loads of mail from London to the Cape, it is interesting to know that these two aviators carried the first aerial mail in the sunshine climes. The letters were addressed to the Prime Minister of South Africa and were from Mr. Lloyd George, then Prime Minister of Great Britain, Mr. Winston Churchill, Major-General Sir F. H. Sykes, Controller-General of Civil Aviation, and Colonel L. M. S. Amery, Parliamentary Secretary for the Colonies. Dated February 3, 1920, from 10 Downing Street, Mr. Lloyd George's letter to General Smuts read :

My dear General.

I am told that two gallant South African Officers, Colonel Van Ryneveld and Flight-Lieutenant Brand, are about to start on the pioneer flight to South Africa by the Cape to Cairo route. I am glad to avail myself of this opportunity to send my best wishes to yourself and to South Africa by the first aerial mail. I do not suppose that Cecil Rhodes and other pioneers of the Cape to Cairo route ever dreamed that the first package to be carried along this route would travel by air and not by rail.

With best wishes,

Yours sincerely,

D. Lloyd George.

Such was the first flight from London to the Cape.

III

But it was the R.A.F., as I have said, who really blazed the airway to the Cape.

There was a good deal of pioneer work in Egypt, and the trail to the Cape was begun in December 1918, when three

R.A.F. ground survey parties were despatched from Egypt for the purpose of selecting landing-grounds and of organizing generally an air route from Cairo to the Cape.

It was after this preliminary work that the competitive flights by *The Times* machine and others began, and the successful accomplishment of the first flight from London to the Cape by Van Ryneveld and Brand in March 1920. From this date a considerable period elapsed before the route could be developed as a commercial proposition, but in the meantime the R.A.F. carried out periodical flights from Egypt to the Cape, thus keeping open the route and acquiring much useful information.

It was in 1926 that the first flight of four service aircraft was made from Cairo to Cape Town, and the route has since been flown annually by a flight of military machines. This first flight was led by Wing-Commander Pulford, O.B.E., A.F.C., and the machines were military two-seater biplanes of the Fairey type fitted with 450 h.p. Napier engines. This is particularly significant, as the machine with which Commander Gayford and Lieutenant Nicholletts subsequently acquired the world's long-distance record for Britain along this same route was also a Fairey-Napier.

Cape Town, on this first R.A.F. service flight, was reached on April 12, 1926. The only mishap was the cracking of a tank in Flight-Lieutenant Mackworth's machine, a not uncommon danger in these atmospheres of extreme heat and cold. Under instructions to fly to England from Cairo on his return, Wing-Commander Pulford led his flight northwards on April 19. At Aboukir, the R.A.F. pilots converted the machines into seaplanes by substituting floats for the wheels, and flew on another 1,000 miles to Lee-on-Solent in England. Here the flight ended. It had successfully demonstrated the mobility of British air power, and gained valuable information for the future civil air routes.

In a congratulatory telegram to Wing-Commander Pulford Sir Samuel Hearn, then Secretary for Air, wrote:

The successful accomplishment of this flight of 14,000 miles over land and sea without a hitch by four service machines is a

most creditable achievement. . . There could be no more convincing demonstration of the assured future of aviation as a mobile and economical instrument of Imperial defence and as a rapid means of speeding up communications between this country and the Dominions. . . .

In the following year, 1927, the second flight of the R.A.F. was led by the late Air Commodore C. R. Samson, C.M.G., D.S.O., A.F.C., Chief Staff Officer of the R.A.F. in the Middle East. Samson was one of the most romantic and picturesque figures in the service. He careered through a life of adventure, and his bravery always brought him through to success. The only trouble experienced throughout the flight he led from Cairo to the Cape and back was a tyre puncture at Abercorn.

The third flight to the Cape and back was led by the then Flight-Lieutenant O. R. Gayford, D.F.C., and Air Vice-Marshal Webb-Bowen, C.B., C.M.G., Air-Officer Commanding R.A.F., Middle East. I mention this particular flight because it undoubtedly gave Gayford much of the knowledge of African flying conditions that he afterwards put to such splendid use on his long-distance non-stop flight from Cranwell, Lincolnshire, to the Cape.

Other regular service flights followed, all of which were gaining experience for the institution of a commercial air route and, incidentally, proving of supreme value for these lone flying adventurers who achieved spectacular fame in their flights. Moreover, it was pioneering the route that the Air Ministry realized would be the natural one for any British pilots attempting the non-stop record. From London, the African route lay directly south. It lay for the most part over extremely dangerous country and with varying climatic conditions. But landing-grounds were being prepared and much of the route was over British territory.

The first attempt on this non-stop record ended in tragedy. The machine that took the air from Cranwell aerodrome on the morning of December 17, 1929, the *Silver Torpedo*, was driven by a 530 h.p. Napier-Lion machine. It carried 1200 gallons of petrol in the tanks and had a flying weight of nine tons. Two very gallant gentlemen entered upon this tragic flight. They were Squadron-Leader A. G. Jones-Williams,

and Flight-Lieutenant N. H. Jenkins. Jones-Williams was a Canadian who won the M.C. and bar and the Croix de Guerre in the war. Jenkins was a test pilot who was awarded the O.B.E. D.F.C., D.S.M., and wounded in an exciting air-fight.

These two fine fliers achieved one remarkable record before they began the Cape flight. They flew the *Silver Torpedo* from Cranwell to beyond Karachi, making the first non-stop flight from England to India. The engine had run for 50 hours 48 minutes; 4130 miles had been covered, and the monoplane had carried a weight of about 16,000 pounds. With such a flight to their credit, they were naturally optimistic as to the possibilities of capturing the non-stop record to the Cape.

It was eight o'clock in the morning when they took off along the long runway at Cranwell. Yet even from the beginning of the flight there was a sinister silence. A brief report appeared in the evening papers that the *Silver Torpedo* had passed over Sardinia. Then nothing more. Weather reports told of a gale raging along the northern coast of Africa. The R.A.F. experts waited for news. The British public waited for news. None came for many hours. Then a report filtered through from the African desert. Natives in the village of Saintemarie du Zit had heard a roar of engines in the sky and then a loud explosion.

The French authorities soon proved that the worst had happened. The *Silver Torpedo* had hurtled into one of those towering peaks that form the Atlas mountains of Northern Africa. The magnificent machine had crumpled into a worthless heap of scrap metal. And the two pioneer aviators had paid for their brave attempt on the record with their lives.

Naturally, after this tragic failure there were many who urged the Air Ministry to prohibit any further attempts upon the Cape record by R.A.F. flyers. At the time, the loss in R.A.F. personnel was rather high, and the pessimists had many strong arguments to their credit. But the R.A.F. was not the service to let any tragic failure end a chapter in its sky records. Quietly a further effort was planned.

The heroes of this occasion were Squadron-Leader Gayford and Flight-Lieutenant Nicholetts. I had the great pleasure of meeting both of these splendid aviators at the Cape after

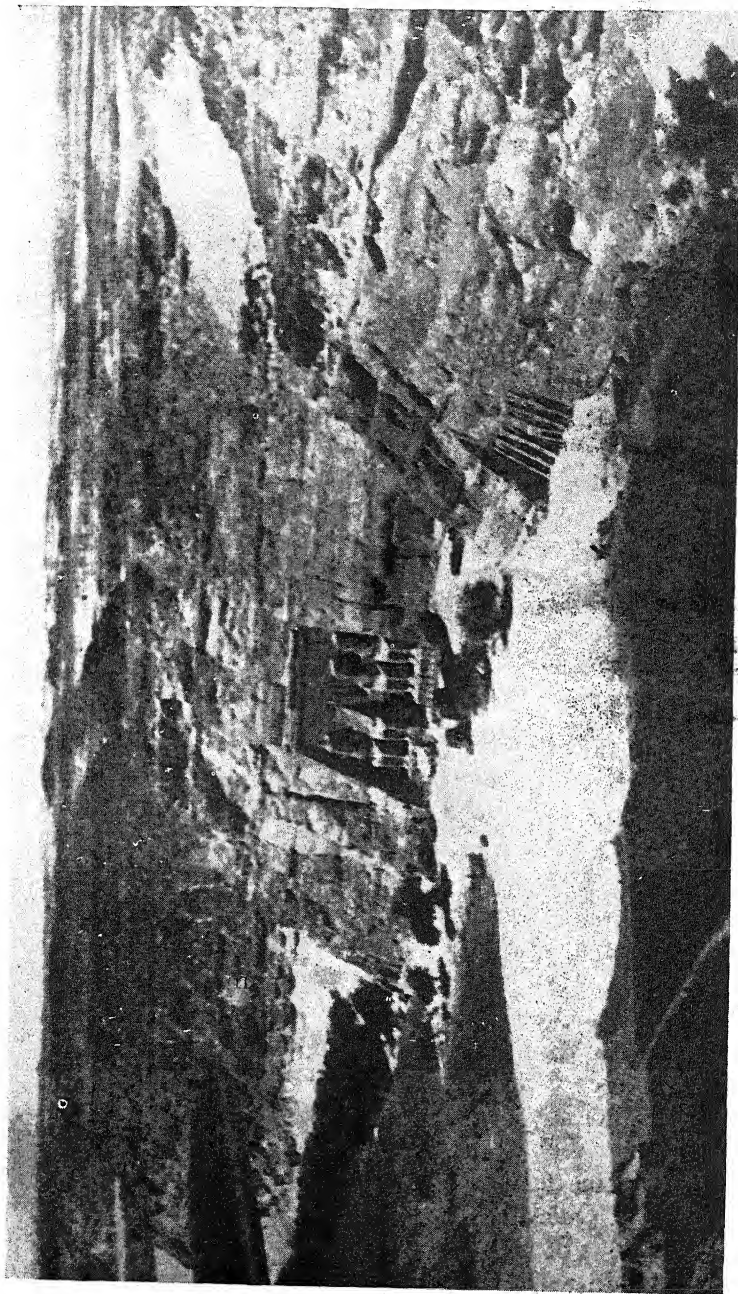


Photo by]

THE TEMPLE OF ABOU SIMBEL

[Author

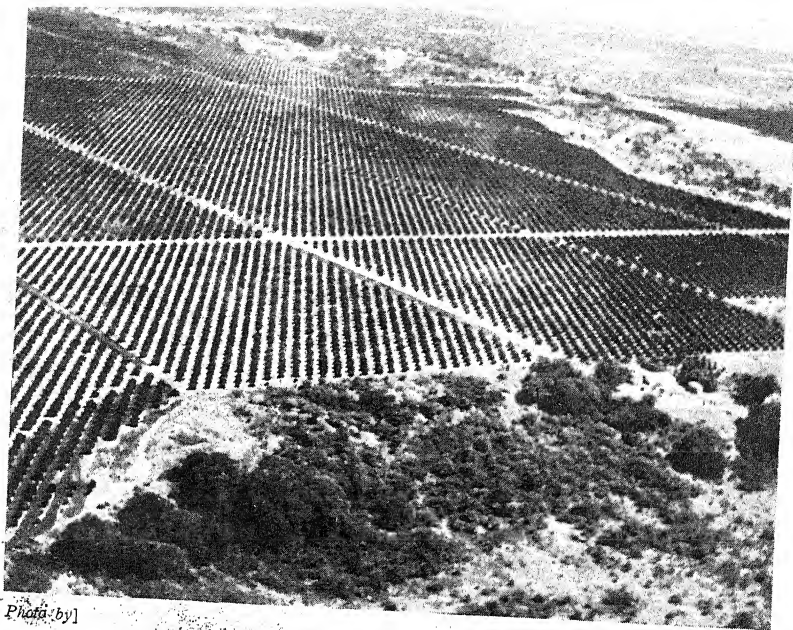


Photo by]

AN ORANGE ESTATE, NORTHERN TRANSVAAL

[Author



Photo by].

THE RAND UNDER A RAINSTORM

[Author

their achievement, and I was myself flying across the Mediterranean leisurely to the Cape at the moment they were also flying south on the record-breaking flight.

Squadron-Leader Gayford, besides commanding the 1928 R.A.F. flight from Cairo to the Cape, served during the war in the North Sea, the Aegean Sea, South Russia, and afterwards in Somaliland against the Mad Mullah. Later he was on service in Constantinople and Irak.

The hero of a number of hair-raising exploits, he was at one time engaged in the destruction of Turkish aerodromes and the bombing from a low altitude of the "Balkan Zug", the daily Berlin-Constantinople express. He was once brought down by a machine-gun bullet hitting his petrol tank, and landed on a Greek island, narrowly escaping death at the hands of a Greek peasant who mistook him for a German.

The officer detailed to accompany him was Flight-Lieutenant Bett. Unfortunately this officer succumbed to influenza and died before the flight began. At the eleventh hour Flight-Lieutenant Gilbert Nicholetts was detailed to accompany Gayford.

The machine used, a Fairey-Napier, was actually two years old. It had already accomplished a flight to Cairo and back. It possessed a 530 h.p. Napier engine that on this actual non-stop flight ran faultlessly at high revolution. The engine fired for 3445 minutes with never a splutter. About $3\frac{3}{4}$ tons of fuel were carried, and a "pilot's assister", giving a greater measure of control, was fitted.

The fliers anticipated being seventy hours in the air. It is interesting to note the food supplies they carried. There were 2 boned chickens, 20 large sandwiches, 48 oranges, 12 apples, 12 bananas, 1 lb. each of dates, figs, raisins, lump sugar, barley sugar, and mint sweets, $\frac{1}{2}$ lb. of chocolate, $\frac{1}{2}$ lb. malted milk tablets, and 8 quarts of black coffee.

The non-stop record that these R.A.F. flyers had to beat was that of the Americans, Russell Boardman and John Polando, who flew from New York to Constantinople, a distance of 5012 miles, in July 1931.

At 7.12 a.m. on February 6, 1933, the long-range monoplane took off from Cranwell aerodrome, Lincolnshire. It

landed at Walvis Bay, in South-West Africa, at 4.40 p.m. on February 8. The distance covered was subsequently recognized by the Fédération de l' Aeronautique Internationale as 5341 miles.

The story of the flight is a tribute to the skill of the pilots. But Gayford and Nicholetts, since they are service men, make no claim on their own behalf. Their official report to the Air Ministry is a tribute to their machine rather than themselves.

This report, a straightforward tale in unvarnished language, is an historical document. It deserves to be reproduced again for those who have not seen it, just as the airmen wrote it for calling to the chiefs at the R.A.F. in London.

The take-off conditions were good, and we left the ground before we expected. We were below the clouds until south of Peterborough, where a gap occurred and we climbed through. The automatic control was put into operation about 9 a.m. We had a glimpse of the Thames, but no sight of ground until about 11 a.m.

"We could not identify our position, so kept to our course and struck the Mediterranean 20 miles west of Marseilles about 11 o'clock. We set a course for Sardinia and then Tunis. Our ground speed was good.

"Tunis was reached at 6 o'clock, and the sky was clear. Rafouan, Kairouan and Gabes were seen, and these confirmed that the commencement of our track across the Sahara was correct.

"Excellent star sights were taken by Flight-Lieutenant Nicholetts, and these fixed our position at midnight and confirmed that our track was correct. The broken high country eastward of Ahaggar looked forbidding in the moonlight from the height of 8,000 feet at which we were flying, and even after the moon set at about 4 a.m. masses of towering rock could be seen below.

"Daylight came at 5.30 and revealed flat, featureless desert country below, with rocky outcrops to the east.

"At 9 o'clock cultivation appeared below. The haze, which persisted, made navigation difficult. A river junction, thought to be the Lokoja, was seen, and about one hour later mangrove swamps commenced, indicating our approach to the coast.

"At about 3.30 the Cameroon Mountains and the island of Fernando Po, both cloud-covered, appeared. We flew round them and settled on to the next leg of our course. The automatic controls required further correction by the use of the drain cock.

"The sun set at about 5.30 in a cloudy, stormy-looking sky. With darkness there was little help from the moon to assist in checking drift or identifying our position, which indicated Northern Nigeria had been entered and a harmattan dust haze commenced, reducing visibility to a radius of a few miles only.

"It was impossible to identify our position. We passed over a good many roads and finally mines and railways, indicating that we were over the Baughi Plateau.

"The automatic controls showed signs of failure in bad weather at about noon the next day. The trouble was rectified by the use of the drain cock.

"At about 1 p.m. heavy white towering cumulus cloud commenced which was accompanied by dust. At about 7 p.m., when flying through rain clouds, the automatic controls failed completely and had to be thrown out of action for the remainder of the flight.

"For the rest of the night we flew for practically the whole time completely blind. The moon gave little help, and clouds and bad visibility made it impossible to get a horizon to fly by except for short periods.

"Dawn found us flying in a clear sky over undulating park-like forest country with occasional houses and roads. In order to fix our position we turned to the westward and struck the coast about 7 a.m.

"We identified what we thought to be Port Alexander and the mouth of the Kunene River, and followed the coast southward all day without position until late in the afternoon, when we knew we were still north of Walvis Bay. We landed at Walvis Bay at 4.35 with less than ten gallons of petrol left."

In conclusion, Squadron-Leader Gayford said: "The engine ran faultlessly for the 57 hours 25 minutes, and we did not experience one qualm on its account throughout the flight."

As this chapter was being completed, the non-stop world record was beaten by those two fine French aviators, M. Paul Codos and M. Maurice Rossi, when they crossed the Atlantic and landed in Syria—a flight from New York to Damascus. It was indeed a great adventure, and among the first to congratulate them, I am sure, were Gayford and Nicholetts.

MM. Codos and Rossi used a high-wing Bleriot monoplane for the record flight with a 650 h.p. engine. They left New York on August 5, 1933, and landed at Rayak, Syria, at 4.25 p.m. G.M.T., having covered a distance of 5650 miles, or 300 miles more than the R.A.F. record.

Here again, the flight of Codos and Rossi was assisted by favourable Atlantic winds. The Fairey machine could do the distance and beat it under similar conditions, but the Government wanted the flight to begin and end on British soil, and therefore the much more difficult Cape route was chosen. Nevertheless, the flight of Codos and Rossi remains one of the best achievements in aviation.

It remains only to tell of other remarkable flights over Africa achieved by the R.A.F., those that spanned the Continent from east to west. The Air Force had for years contemplated linking the Sudan with the West African colonies. As a result of advice tendered by the Royal Air Force in 1924, landing-grounds were constructed in Nigeria. In 1925 the first flight by service aircraft was made to this colony.

Subsequently air facilities were provided by the local administrations in the Gold Coast, Sierra Leone, and the Gambia, making it possible for several experimental flights to be made. In 1927 an R.A.F. flight made the journey from Khartoum to Nigeria successfully. Two years later the flight was repeated, and this time the Gold Coast was included. In 1930 a flight to Nigeria and Gambia was accomplished. The most ambitious flight of all was arranged for 1931. This was to include the Gold Coast, Gambia, and Sierra Leone, but an outbreak of yellow fever in West Africa caused the flight to cancel arrangements.

Altogether the R.A.F. has cause to be very proud of its great pioneering work with wings over Africa.

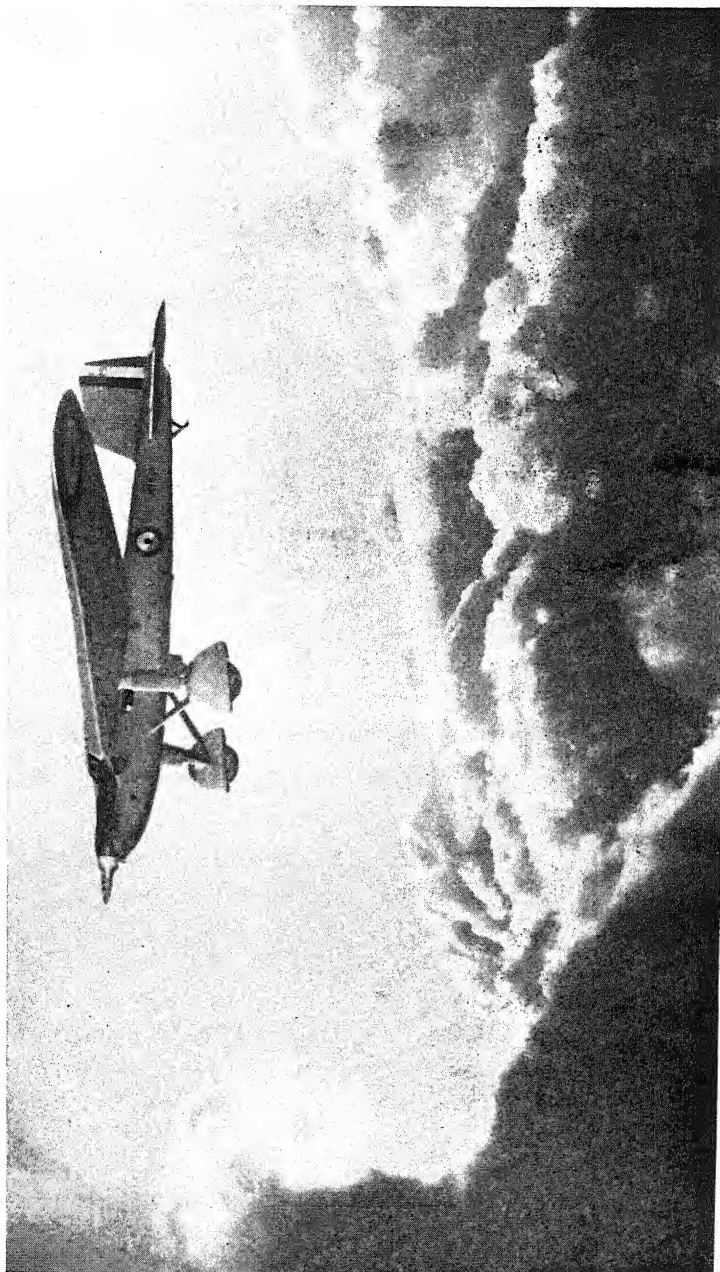


Photo by courtesy]

FAIREY NAPIER LONG RANGE MONOPLANE

["Flight"]

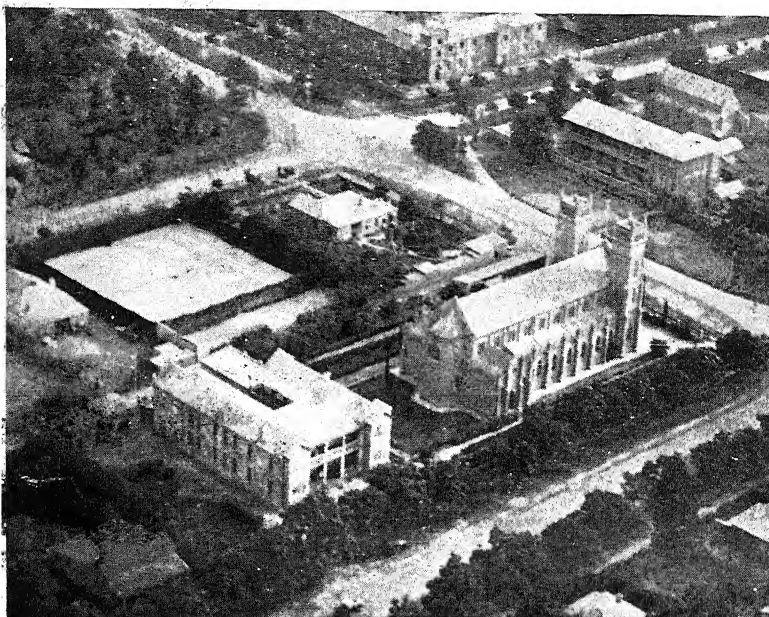


Photo by

SALISBURY CATHEDRAL, SOUTHERN RHODESIA

[Author]



Photo by

CLOUDS OVER THE MATOPPÓS

[Author]

IV

But the lone pioneers, and particularly those brave women fliers over Africa, must not be forgotten. If they achieved a large share of spectacular newspaper publicity it must also be admitted that their experiences all helped towards a better and more complete knowledge of the route.

From the time when Pierre Van Ryneveld conquered the route there was nearly a six years' pause. In November 1925 Alan Cobham began a flight which was to mark an epoch. Of this pioneer of Empire flights Mr. Benjamin Bennett, in his book, *Down Africa's Skyways*, writes:

"If there had been no Cobham, Imperial Airways would not have extended their arm of service down the African Continent as early as 1932. Others may, would, have gone down Africa with a stopwatch in their hands; but Cobham kept his eye on a ready-reckoner. He was the man who worked out the pounds, shillings, and pence of the African route. On his pioneer work is built the present structure of the Trans-African Airways."

Cobham's schedule provided for a flight of sixteen days, but actually he took a month longer than he intended. This, however, was not due to mishaps, from which the flight was singularly free, but to numerous "air-minded" engagements on the way—all of them opportune and, indeed, necessary as propaganda for the possibilities which Sir Alan Cobham had made it his business to demonstrate. There were no serious incidentals on the journey back. The airman set out to beat the mailboat, and succeeded. He flew from Cape Town to London in fifteen days, with eighty hours' actual flying time.

Sir Alan Cobham's second flight was begun in November 1927 in the monster flying-boat *Singapore*. A broken wing at Malta prevented him from reaching Cape Town before the end of the following March. On the return journey he explored a new route along the west coast—successfully, except for a forced descent in a very remote spot on the French Ivory Coast. Lady Cobham was one of the crew of five, and lived

for nearly six months in the little metal cabin of the great seaplane.

The first solo flight, in a Moth, was made by Lieutenant R. R. Bentley in September 1927. He aimed at the then unprecedented time of fourteen days; actually he accomplished the journey with singularly little misadventure in twenty-six days. From this date onwards a succession of solo fliers have brought the time down to what would have seemed in 1920 quite fantastic limits.

In 1928 Lieutenant Patrick Murdoch—not to do things by half—determined to fly from England to the Cape and *back* in less time than it had taken Lieutenant Bentley to accomplish the outward journey. The first part of the programme succeeded, for he reached the Cape, after a very difficult flight, in eleven days—less than half Bentley's time; but on the return journey his Avro-Avian came to grief in turbulent air currents in the Belgian Congo, and he only escaped death by a desperate leap from his flaming machine.

Two years later, Lieutenant R. F. Caspareuthus—who passed over Beauvais the same day as the R 101 met with disaster—set himself to excel not only Murdoch's solo achievement, but the record time of ten days which the Duchess of Bedford and Captain Barnard had accomplished earlier in the year. He brought the time down to eight days, with 76½ flying hours and an average speed of 105 miles per hour. To Lieutenant Caspareuthus also belongs the distinction of having piloted the first regular air mail from South Africa to England. I met this modest aviator on my flight to the Cape. He is now one of the regular pilots of Imperial Airways. Incidentally, he gave me one of the best glimpses of big-game in Africa that I had all along the route.

This record by Caspareuthus was not to remain long intact, for in March 1931 Lieutenant-Commander Glen Kidston covered the distance in six days and ten hours. This feat was not only remarkable in itself, but was intended to be, and in fact was, a stimulus to the development of Imperial Airways service, and its significance made all the more lamentable the accident which soon after ended what seemed to be a charmed life. Even Glen Kidston's record

fell, in the same year, before the onslaught of Mr. Gordon Store and Miss Peggy Salaman, who cut off half a day from the record time. It is interesting to note that Mr. Gordon Store is now running an aerial taxi service at the Cape and doing much to make Cape Town air-minded. He flew in his latest machine over Table Bay, Table Mountain, and False Bay, giving me some unique views of what is undoubtedly among the most beautiful spots on this earth.

After this came Mr. Mollison, in March of 1932. He clipped more than thirteen hours off the Salaman-Store record, but because of the dazzling lights of the Cape Town aerodrome he was forced to try to land on a beach of Table Bay. There he crashed his machine, but rode triumphantly to the aerodrome in a taxi-cab which he discovered conveniently near.

It remained for his wife, Amy Johnson, to beat this record. On her arrival at Cape Town at half-past one on the afternoon of November 18, 1932, Mrs. Mollison established a new record of 4 days, 6 hours, and 54 minutes for the journey of 6220 miles from England to Cape Town. This was 10 hours 28 minutes better than the record set up by her husband in March the same year. Incidentally, Mrs. Mollison chose the west coast route as being the quicker, although at the time its chain of aerodromes could not compare with that of the east coast route.

In her Puss Moth, *Desert Cloud*, she left Lympne just after half-past six on the morning of November 14. She arrived at Oran the same evening after landing first at Barcelona. She spent only four hours in Oran and then took off for the desert crossing to Gao. Thereafter there was some anxiety, as the news of her safe arrival at noon on November 13 took a long time to get through.

Mrs. Mollison wasted no time at Gao and took off again for Duala, but after flying for only an hour made the unpleasant discovery that the tanks were only a quarter full. She just managed to get back to Gao. Here she stayed till the early morning of November 16, whence she once again took off for Duala, which she reached the same afternoon.

Staying here for less than two hours, she pressed on but, after passing over Benguela, found her oil pressure falling,

so turned back and landed on the aerodrome there, which was reported to be a sea of mud. It was then the early morning of November 17. Here she tackled the job of correcting the fall in oil pressure. Apparently the trouble was a clogged filter, but there was little equipment available and a poor selection of tools. Mrs. Mollison did the job herself and nine hours later was on her way.

This time she did not go far and landed two hours later at Mossamedes, where presumably she called a halt for a brief rest before beginning the second longest stage of her flight.

Very early next morning she set out for Cape Town. Here she arrived from an unexpected direction and so missed the three machines which had gone up to escort her to the aerodrome.

She was received by the Mayor and Deputy Mayor with their wives, the Town Clerk, and a number of councillors. The enthusiasm of the crowd, some members of which had been waiting all night, was beyond police control, and some time elapsed before Mrs. Mollison was released from her machine.

She said that the weather had been unfavourable and had bothered her all the way with head winds, fog, rain, and mist. Crossing the desert was trying, but the worst stage was flying through the night from Duala to Benguela. She had only five hours' sleep in all, and that in three snatches.

The actual lengths of the stages were as follows: Lympne-Gran, 1130 miles; Gran-Gao, 1370 miles; Gao-Duala, 1070 miles; Duala-Benguela, 1150 miles; Benguela-Mossamedes, 200 miles; Mossamedes-Capetown, 1300 miles.

Mrs. Mollison made her return journey on December 11. Conditions were not so favourable for this return flight, but she nevertheless accomplished the journey in the respectable time of 7 days 7 hours 5 minutes—incidentally a record for the northward flight from the Cape. A large crowd of some 10,000 people welcomed her at Croydon. It was an indication of her own popularity and the realization by the general public of the importance of the African air route.

With many of these great pioneer flights one name will always be linked, and rightly so, for the world of aviation will not forget what it owes to Lord Wakefield, an ever-generous supporter of British flying.

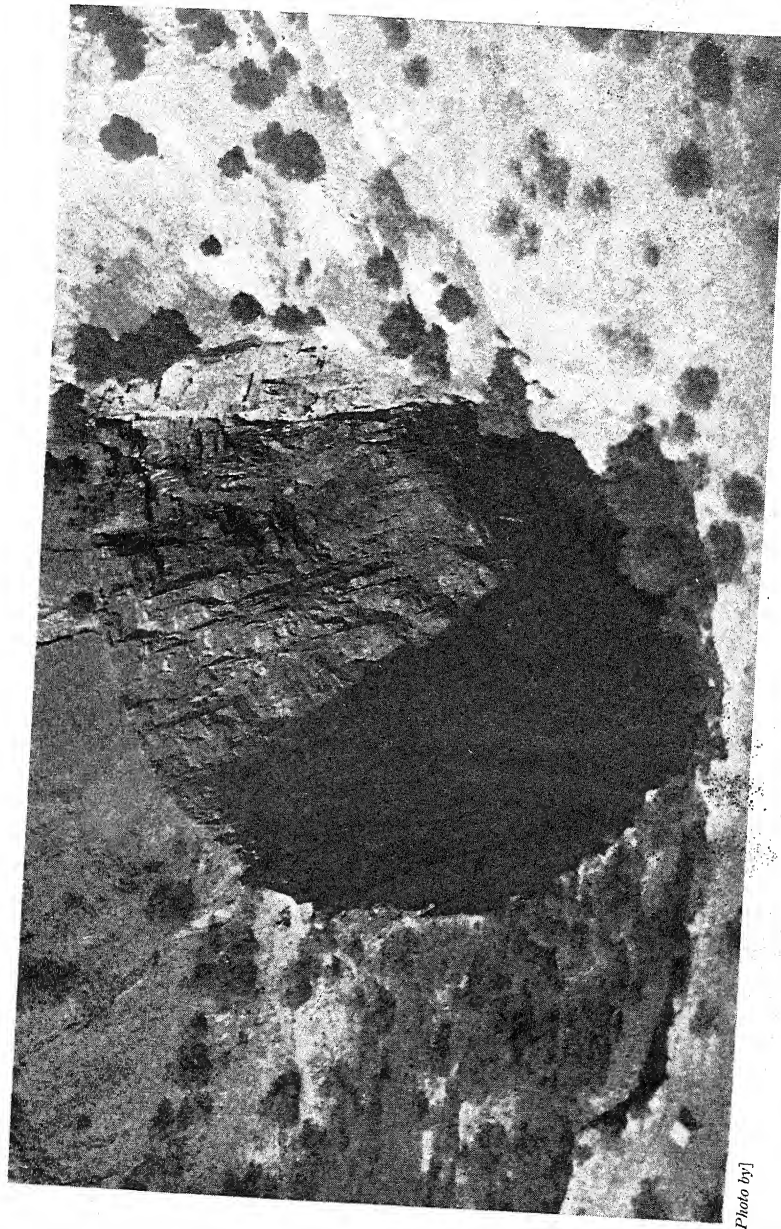


Photo by]

THE "BIG HOLE," AT KIMBERLEY

[Author



Photo by]

[W. J. Makin

GORDON STORE, A FAMOUS SOUTH AFRICAN AIRMAN, AND THE AUTHOR
ON THE AERODROME AT WYNBERG, CAPETOWN

The reader may consider these flights over Africa exceedingly spectacular. Many of them enjoyed the element of chance. They all revealed what a tremendously ambitious undertaking was the regular commercial route to the Cape successfully achieved by Imperial Airways. The regular arrival and departure of the African mail planes from Croydon and Cape Town, the shortening of the time en route from eleven days to ten days, and the record of safety and punctuality in and out of season are in themselves tremendous achievements.

The difficulties confronting Imperial Airways in the beginning were immense. True, the service from Croydon to Cairo, which was along the India route, already existed. But the terrain southwards presented a thousand and one problems to commercial flying. Between the Sudan and Southern Rhodesia extreme heat and torrential storms of every variety were normal. The type of country made it impossible for forced landings over huge areas, civilization of any kind was sparse, ground organization was primitive, and some of the regular aerodromes were situated so high that, coupled with the heat, a large and costly reserve of power on all aircraft was essential in order to take off at all with normal loads. Moreover, the transport of fuel, oil, and supplies to all aerodromes on this route presented a serious and expensive problem. Again, it was discovered that some of the aerodromes en route had been abandoned, and others left in charge of local chiefs.

Imperial Airways set about their titanic task. It was work of an Empire character, which might well have deterred those old chartered companies whose commercial enterprise helped to found the Empire. It was decided that the personnel along the African route would have to number at least 300. All these men had to be trained at headquarters in London and at the Croydon aerodrome. "Stationmasters" had to be trained to a high standard, with special qualifications for the widely varied conditions between Cairo and the Cape.

One often reads romantic stories of the pioneering of railroads in the United States. One day an epic might be

lashed of the despairs and disappointments of creating an airway half-way across the world. The Croydon-to-Cape route would provide any film-producer with a screen epic that would thrill a nation.

No sooner were the pioneer men of Imperial Airways taking up their positions in Africa than sickness interfered. Despite special provision and instructions, there was a time when more than half the strength was down with malaria. If at the cool of sunset men go out in shorts and bare skin to play games or take other recreation they are apt to fall a prey to the germ-carrying mosquito or some other pest.

Much of the country had never been thoroughly explored. It still remained the Dark Continent of Livingstone and Stanley. Yet the surveyors of the route had to try to arrange that none of the aerial hops should exceed 250 miles. But even when the night stops had been decided upon, it was discovered that some of the aerodromes would have to be situated on high plateaux possessing an altitude of something like 6000 feet. Here it was surmised, and subsequently proved, that the air was very much thinner than on the plains, and this would necessitate the employment of aircraft specially suited to such conditions.

The real work of the surveyors was to check all available data, to arrange for suitable aerodromes and supplies, to see that there was water in the vicinity, and that bungalows could be provided for the resident staffs. In addition, there were emergency landing-grounds to be prepared, any possible drawbacks near any landing-place to be noticed and scheduled, and also trails requiring blazing. Definite landmarks were hewn out of the forests and in the deserts to tell the pilot that he was on his course. In addition a complete set of new maps were prepared by expert cartographers. Africa, with the sameness of the country over immense stretches, is the easiest continent in the world for an airman to lose himself in.

All these immense difficulties, all the thousand and one problems, were at long last overcome. A telegraph message flashed the news that the route was ready for the first air liner. Twenty-seven main air stations had been built. There

were also thirty intermediate landing-places not always to be used. For many of these the bush had to be cleared. Many of them were flooded in the rains. At some air stations the pioneers had to form themselves into big-game hunts to drive away the lions and elephants that fought to preserve the sanctity of the bush.

Hangers, workshops, and stores had had to be made, and before the aerodromes and machines were ready much transport had to be managed by bush paths and native porters. At seventeen of the stations wireless offices and a most comprehensive wireless system had been built up. In addition, a meteorological system and service had to be created.

Yet, with true British phlegm, the opening of this great new route by Imperial Airways in 1932 was done in a casual and almost secretive manner. And an early setback was encountered. Air Vice-Marshal Sir Vyell Vyvyan, K.C.B., D.S.O., Lady Vyvyan, and Mr. F. G. L. Bertram, Deputy-Director of Civil Aviation, met extremely bad weather on their outward trip in the *City of Bagdad* and were forced to land near Mpika, in Northern Rhodesia, after vainly trying to cross a line of hills in the face of a storm.

When the party reached Bulawayo there was further bad news. The *City of Delhi* had been lost in the bush forty-six miles away. The crew fortunately had emergency rations and water on board. But it appeared that the pilot was a little uncertain of the swamp into which he had fallen and gave a wrong compass-bearing over the wireless. Search planes had some difficulty in locating the missing machine.

Eventually they were discovered. Food was dropped by parachute from the air, and a land rescue-expedition, guided by smoke from a signal fire, cut their way through the bush. The *City of Delhi* was found stuck up to the axles in a swamp, but undamaged. It necessitated digging a runway, and then dragging the machine bodily out of the swamp. That the machine did not suffer drastically I can testify, as during my subsequent flight over the African route I travelled a good many air miles in the old *City of Delhi*.

Despite this rather dismal beginning, the pioneers of the great air route refused to admit defeat. Within the space of

A few weeks the African air route was running to time with the almost clockwork regularity of the Croydon-to-Le-Bourget route—an incredible achievement over the world's most adventurous sky journey. The passenger lists began to include a growing number of celebrities as well as those matter-of-fact travellers concerned only with the quickest method of transport—the business men.

Among the first unofficial passengers carried was Major Ewart Scott Grogan, D.S.O. In 1897, fired by the philosophy of Cecil Rhodes, Major Grogan set out from the Cape to walk the continent to Cairo. That stroll through Africa took him three years to accomplish. He started off optimistically with 150 native porters—and was found south of Khartoum years later, bearded, tattered, exhausted, with boots tied with string, ten rounds of ammunition, and a body racked with fever.

In 1932, in the *City of Karachi*, he flew in luxurious comfort the 6000 miles he had taken three years to cover on foot in exactly eight days. But it was a great compliment of Imperial Airways to carry this fine pioneer as a first passenger. Major Grogan can really claim to have blazed the trail. I met him en route to Kenya and found him as picturesque and adventurous to-day as he is in his famous book on that great walk through Africa.

Grogan has the strangest pair of eyes. They are like the eyes of a leopard. Indeed, the natives of Kenya long ago conferred on him the name of the Leopard Eyes. He is just as ready with his fist as he is with his tongue. Now he spends his days advocating in and out of season the settlement of Britishers overseas.

"My trek through Africa on foot started in 1897 from the Cape, ended in Cairo in 1900, and during those three years of adventure I saw Africa as only those who have travelled through it on foot can possibly know it", wrote Major Grogan in the South African weekly, *The Outspan*. "But, having now traversed Africa by air, I have seen this vast continent from an altogether new angle, and it has been a sight almost too awe-inspiring to describe.

"When you travel through Africa on foot, as I did for

the most part in the three years I took to do the journey; you may plumb the depths of its amazingly deep and varied character, you may even learn some of its secrets, but you cannot gain any impression of its immensity. On foot or by motor-car you travel along paths surrounded on either side by dense scrub, by elephant grass that towers above your head, by papyrus and by many other varieties of trees and reeds; you see nothing except when you are in the desert, and then you see only sand, sand, and yet more sand, with perhaps a lizard sunning itself on a rock. When travelling on foot you see Africa as though you were a snake rustling through the undergrowth. But from the air you see Africa as an eagle would see it. You dance from kopje to kopje, from highland to lake. You get the bird's-eye view, which is essentially one of proportion. There are spaces that simply terrify you; you are literally frightened at the awful immensity of it all. It is one of the most terrifying things in the world—this immensity, this spaciousness, this seeming infinity; and while it terrifies, it inspires. . . .

" . . . Time and again, as I looked down from the aeroplane, I saw places I remembered after more than thirty years. As you look down you become again the adventurous youth of twenty-two; you live through your adventures again. You remember—and you marvel at it—how you would come across half a dozen herds of elephants settled on the banks of some swamp; they would take not the slightest notice of you, and you would in a fit of pique go and throw a clot of mud at one or the other of them. . . .

"Finally, in this flight, you get a vivid impression of history. In going from Africa to England by air you go through history, as it were, in six days: you pass from the cradle of man to Egypt and its civilization; you pass to Crete and thence to Athens, the centre of Grecian civilization; from Athens you go on to Rome, and finally to the phantasies of London. You pass from primitive man to the London clerk! It is an education in itself."

Another distinguished passenger carried by Imperial Airways along the African route was King Albert of Belgium. King Albert wished to make a rapid tour of the Belgian

Congo, and he found the service placed at his disposal by Imperial Airways amazingly valuable. In fourteen days the King travelled about 7500 miles in British Imperial Airways airplanes.

In a special interview granted to the *Daily Telegraph* the King commented on the perfect organization of the service. "I congratulate myself," he said, "on having chosen this air route up the Nile. The journey was accomplished without the slightest hitch. The 'planes combine comfort, safety, and speed."

The Nile is a wonderful route by which to reach the centre of Africa. Big towns are scattered along its banks: Alexandria, with its 80,000 inhabitants; Cairo, whose population is 1,500,000; Assuan with 60,000 people; and Khartoum with 150,000. In this way you reach Uganda in the very heart of the continent, a region that has a great future. Many parts of it are highly developed and have a very progressive native population."

He admitted that while they were crossing the Sudan the heat was rather trying. "At Khartoum," he continued, "Captain Howard of the Royal Air Force took me on board a Fairey machine, which enabled me to make a few detours and see the country between Khartoum and Lake Albert more adequately."

"A further courtesy was extended to me. For the return journey Imperial Airways had sent a special 'plane, which allowed me to travel faster and cover the distance between Khartoum and Assuan in one flight. Mr. Gordon Olley was the airman. He has often piloted the Prince of Wales, and is said to have flown a greater distance than any other aviator."

His Majesty, who enjoyed the hospitality of Sir John Maffey, Governor-General of the Sudan, both on his outward and his homeward trip, spoke of the remarkable success of the measures taken against malaria at Khartoum. "There is no longer," he said, "a single mosquito, and you may sleep with the window open."

Reverting to the subject of his aerial holiday which had impressed him so favourably, the King again emphasized his feeling of safety during the flights. Sometimes the Nile or the

railway, he pointed out, was visible, and one's attention was concentrated on the changing and at times chaotic landscape.

His Belgian subjects, King Albert emphasized, have become steady patrons of this air line which enabled those who wish to reach the Kivu region of the Congo to save much valuable time. Not a single accident had occurred on it, and the same could be said of the Belgian line, the Sabena, although the Congo was extremely difficult country for aviators on account of its forests and fogs.

Almost a year following upon the opening of this Great African route saw Sir Eric Geddes, chairman of Imperial Airways, accompanied by Mr. George Woods Humphery, the managing director, leaving Croydon on December 27, 1932, for a personal survey of the route. The flight was most successful, and at the end of the flight Sir Eric Geddes summed up his impressions.

"The purpose of the visit was twofold," he said. "In the first place the African route is an outstanding example of co-operation between the British communities along it, and everyone contributes in cash or in kind to the service. It therefore seemed to the Board of Imperial Airways to be fitting that I and the managing director should make a tour down the route to call upon and pay our respects to the heads of Government of each community, taking also the opportunity of discussing with them the future development of the service and any local problems which confronted them.

"The second object of the tour was that we should inspect the route. We flew in one of our largest aircraft which is now operating between Egypt and Kenya. We do not, in these days of excellent British aviation material, expect anything untoward to happen, but it is satisfactory that never for one moment did the aircraft or her equipment give us the slightest anxiety or trouble on the whole journey. Did we keep good time? Certainly, we were always on or ahead of schedule on the whole journey with the exception of the last couple of hundred miles when we struck a tremendous gale crossing the Hex River Mountains, and this made us an hour or so late at Cape Town—not bad for a journey of eight thousand miles; especially when, in response to many pressing official invitations, we made

special landings in order to meet the mayors and authorities responsible for the fine municipal air ports on our route. . . .

"To summarize my impressions of my journey, it was uneventful and not tiring. Although I and my party received boundless hospitality from the Governors, high officials and business communities the whole way down the route, nevertheless we made a point of inspecting and testing, wherever possible, the normal accommodation offered to passengers, which, broadly speaking, is adequate and reasonably comfortable, as our night stops become more fixed and permanent. The air mail is now a major part of the life of the people, and a tremendous boon to our fellow citizens overseas. The greatest time advantage is of course to the communities in Central Africa, which have not got the highly developed sea service enjoyed by Cape Town, Durban, etc. We were also very much struck by the magnificent air ports provided by the municipalities and other public authorities. In the Union of South Africa they are very air-minded, and take great pride in their air ports, which are mainly municipally owned. Altogether the trip has been most instructive to us, and very useful; and as the first great British air route, built up, as I hope others will be, on a co-operative basis, it has convinced us of the enormous future which lies at the feet of the Commonwealth of Free Nations which forms the British Empire, and it will, I think, do more than anything else to bind us close together."

My own experience a few weeks later was similar to that of Sir Eric Geddes, for throughout the length of this journey I found the same admirable regularity coupled with the kindest hospitality.

At Cape Town I had the honour of addressing Members of both Houses of Parliament, and at more than one centre gatherings of newspaper friends. On each and every occasion I came across a great and growing interest in the development of Empire airways.

Incidentally Sir Eric mentioned that there was no intention of abandoning the present Africa route and adopting the west coast route, which would mean making terms with foreign governments. The Imperial Airways route to the Cape is to remain an all-red route.

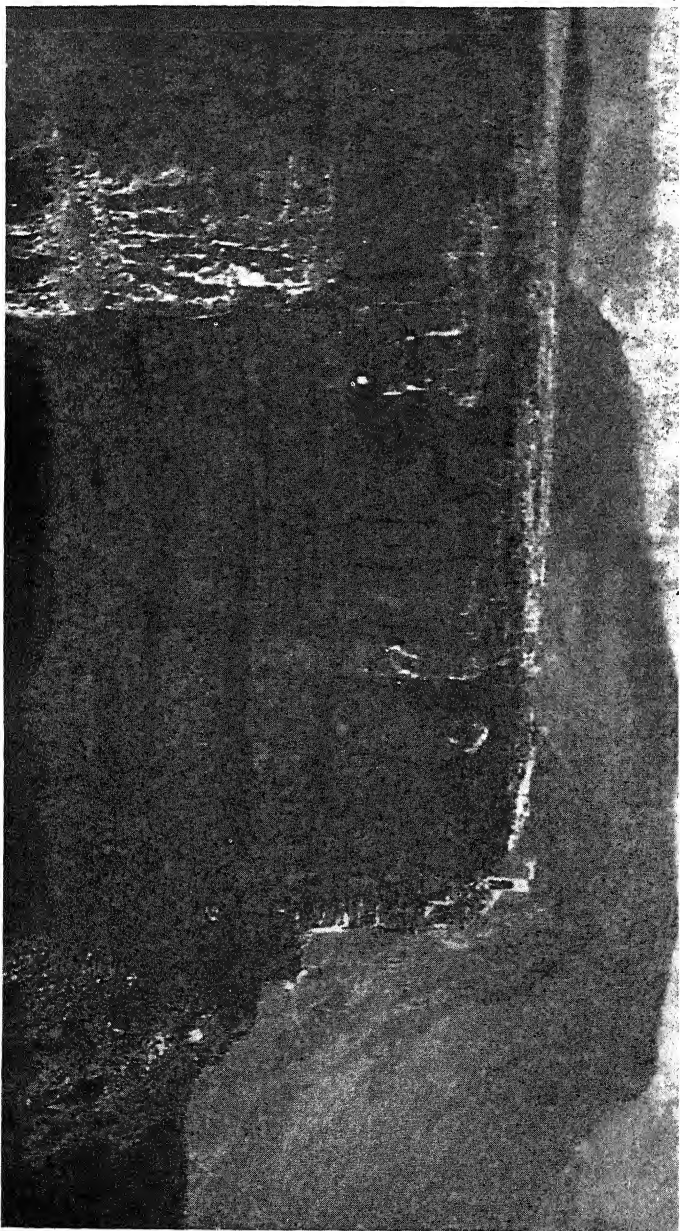


Photo by

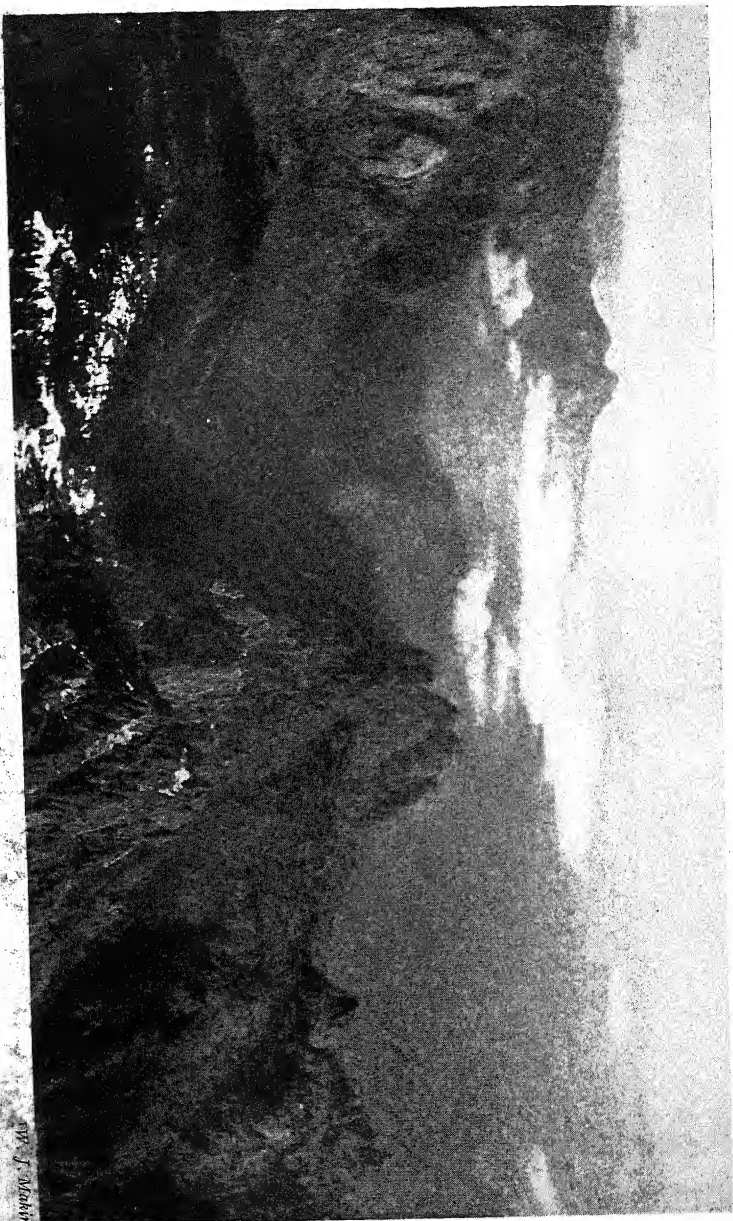
TOP OF TABLE MOUNTAIN, CAPE TOWN

Author

Photo by J.

THE LAST BARRIER TO THE CAPE OVER THE HEX RIVER MOUNTAINS

W. J. Dobson



To the suggestion that the mail passenger service should be separated, Sir Eric replied that the service must remain a commercial one and there is not at present sufficient trade to justify such a development, especially as the bigger the 'planes the more economical the working. He stated that there had been no negotiation either with France or Italy to secure the speeding up of the present Empire service through better flying facilities over those two countries, but it is to be hoped that this difficulty will ultimately disappear.

Atalanta was the first of the £150,000 fleet of eight new four-engined passenger monoplanes which have been designed and built specially for Imperial Airways to operate this African route. I myself had the honour of flying from Croydon to the Cape in the second of these monoplanes, *Artemis*, and so was able to gain a good deal of knowledge of the air fleet with which Imperial Airways is conquering Africa.

This air fleet includes the following classic names: *Atalanta*, *Andromeda*, *Artemis*, *Astræa*, *Amalthea*, *Arethusa*, *Athena*, *Aurora*.

The air fleet was constructed by Messrs. Armstrong Whitworth Aircraft, Ltd., of Coventry. Each of the monoplanes when fully loaded weighs nearly eight tons, of which more than two tons are available for the accommodation of crew, passengers, mails and goods. They each have a span from wing-tip to wing-tip of 90 feet, while from nose to tail they measure 71 feet 6 inches.

Driven by four Armstrong-Siddeley double Mongoose engines, developing a total of 1400 horse-power, they not only have ample power to ascend with full loads from the high-altitude aerodromes which exist on the African airway, but their reserve of power is such that even in tropical conditions they are able to continue in flight with only three engines in operation at any height up to 9000 feet, that is to say, as much as 3000 feet or over half a mile above the highest aerodrome. This high performance has not been required on the European or Indian air routes, and has not hitherto been provided in any country in the world.

The maximum speed of these new monoplane air-liners is between 140 and 150 miles an hour, while they cruise at a

speed of approximately 120 miles an hour, which will enable considerable acceleration to be effected in the time-tables of the sections between Cairo and Capetown.

A feature of the new monoplanes, and one designed to provide a maximum of comfort when flying under tropical conditions, is the large size of the saloons and the amount of space provided for each passenger. Special armchair seats are fitted of a type enabling the aerial travellers to recline at full length whenever they desire to do so.

A special system of ventilation is installed in each machine by which air is drawn in through ducts in the nose of the monoplane and then distributed through the cabin. This means that passengers find it cool, high up in the air, even when they are in flight over the hottest sections of the African route. Aerial travel in these new machines is, in fact, the most comfortable, as well as by far the most rapid, form of travel in Africa, more especially as the four engines are all mounted out on the wings, well away from the body of the machine, thus ensuring a maximum of quietness in the passenger saloons, the walls of which are also insulated with sound-deadening materials.

These eight British air-liners, which are of lightweight strip steel construction adopted specially for aircraft use, represent, together with the necessary spare parts, a total cost of £150,000, and have been designed especially to meet the conditions, geographical and climatic, of the trans-African route which stretches for 6000 miles from Cairo to Cape Town.

VI

Once Imperial Airways had successfully conquered the main route from Croydon to the Cape, a number of air feeder services began to be created throughout Africa. These feeder services are now of great importance, and a description of the African route would be incomplete without some reference to them.

These feeder services connect outlying territories with the main air route. At Juba in the Sudan, for instance, passengers for the Belgian Congo who have come from Europe by Imperial

Airways are taken by motor services to Stanleyville. The Congo services of the Sabena air line call there.

Passengers who fly north from Cape Town can change at Broken Hill in Northern Rhodesia to a feeder air service to Elizabethville in the Congo. A train link to Port Francqui connects with the Congo Airways which run from Lulabourg to Leopoldville. Plans are well advanced to substitute an aerial link for the train.

In Rhodesia the local authorities are hoping to put a scheme into effect whereby light aeroplanes will distribute the mails left by Imperial Airways at Salisbury. The fact that there are many townships and districts without rail service increases the importance of this project.

Since the beginning of 1932 the South-West African Airways Ltd. have been running a feeder service from Windhoek in South-West Africa to connect with Imperial Airways at Kimberley, and the greatest regularity has been maintained. Charter services are also in increasing demand for administrative journeys, hunting parties and business.

An example of such feeder air lines extending the benefit of the air mail over areas of hundreds of miles is the coastal route operated by Wilson Airways, which links up Dar-es-Salaam and other towns in Tanganyika Territory with the Imperial Airways route at Nairobi, connections being provided with both the northward and southward Cairo-Cape Town services; while another air link is that extending for approximately 200 miles from Kisumu, on the main trans-African line, across the shores of Lake Victoria via Jinga, Torrore and Eldoret to Entebbe. This route is flown by the ubiquitous Puss Moth.

During my own African flight I had an opportunity of seeing something of the excellent work performed by these feeder lines. Certainly one of the most effective is that of the South-West African service. It was on January 26, 1932, that the Windhoek-Kimberley service was inaugurated.

A brief glance at the record of the South-West Airways is sufficient to convince one of the efficiency and regularity of the service. From August 1, 1931, to July 31, 1932, they carried out 168 through trips for air-mail services, covering 78,324

miles in the flying time of 905 hours at an average speed of 86.5 m.p.h. 187 passengers were carried during the air-mail trips. Besides the air-mail trips many others were carried out for business, domestic or pleasure purposes, bringing the total mileage up to 98,277 over a flying time of 1167.11 hours, and carrying 598 passengers. At no time during the period under review were there any forced landings nor were any accidents or losses incurred. No claims were made against the Airways, and, in short, their organization and efficiency was 100 per cent.

The number of passengers, the amount of air-mail matter and the freight carried are steadily increasing. From every aspect the service shows promising signs of development and increased numbers of passengers.

The remarkable efficiency of the Airways is not alone due to the high standard of their organization, but also to the wonderful capabilities of their pilots and the efficiency of their aircraft. Compelled as they are to fly under most exacting conditions, more often than not adverse in the extreme, the fine record of the South-West Airways is deserving of special praise. Not only must their pilots be first class, but their aircraft—Junkers all-metal monoplanes—too, must be capable of working under any and every type of weather conditions, ranging from superlative heat to extreme cold. That the aircraft are capable of these arduous undertakings is proved by the record of the company. This record, however, would not perhaps exist were it not for the splendid efficiency of the workshop and mechanics of the Airways in Windhoek, who maintain the aircraft and carry out to the best of their ability the desires of the manufacturers. The record of the Airways shows to what extent these desires are fulfilled. The all-metal Junkers' planes appear to be particularly suitable for this country, especially in view of the fact that where planes remain overnight at Windhoek there are no hangar facilities, necessitating their remaining out in all manner of weather. Occasionally one hears complaints that the air-mail service is an unnecessary extravagance for South-West Africa, but, apart from the fact that it has on many occasions been amply proved that the air-mail service is essential for the progress of

the country, the increased patronage which the air-mail service is securing by reason of the benefits it provides for the commercial community and the administration is sufficient evidence for the necessity of an air-mail service from Windhoek to Kimberley to link up each week with Imperial Airways' service from London to Cape Town.

Then there is the proud record of Union Airways, which has covered some immense distances throughout South Africa, and has done much for the development of air sense south of the Zambesi. In five years' time Africa will have a complete network of airways from coast to coast, all joining the All-Red route that links the Cape with Cairo, and from the latter airport the whole of Europe and most countries in Asia can be reached. Even to-day it is possible to fly from Cape Town to Singapore, from Johannesburg to Calcutta, or from Khartoum to Moscow, using regular air lines all the way.

So far I have not drawn attention to the west coast air route in Africa. This route through the Dark Continent cannot be ignored. The Imperial Airways route is by way of Egypt and the east side. This is an essential route, inasmuch as it passes through British territory throughout, and each of the territories connected by air pays a small subsidy for the delivery of air mails. It has not yet been proved that a route via the west coast would be commercially payable.

At the same time the achievement of the R.A.F. flyers. on their non-stop flight to the Cape, and the flights by Mr and Mrs. Mollison along this route, have rather called attention to its time-saving possibilities.

The west coast route includes the crossing of the Sahara, where the French are established, with a route at present travelled partly by car, but soon to be entirely by air. Naturally the French claim air rights over the Sahara, but an arrangement might be made for British machines to use this route on the way to the West African colonies.

From Lagos to the Cape the route would tap immediately rich traffic resources, gold transport, passengers and mails. At many points it would link up with Belgian and Portuguese lines. France, Germany and Italy have their eyes on the possibilities of this west coast route, and there are indications

of Italian and German co-operation in more ways than one.

As I have previously pointed out, the R.A.F. service flights have done much to explore the possibilities of this route. One advantage of the west coast route is that it does not involve flying to and from aerodromes at high altitudes, a serious and costly operational drawback of the eastern route.

But a useful scheme for developing this air route has already been projected. After a preliminary survey of Nigeria, the Gold Coast and Sierra Leone which was completed recently for the British Air Ministry, three services might be inaugurated to link these colonies with the French and Belgian air-mail services to Europe.

The chief of these routes would be one operated by flying-boats along the 2290 miles of coast between Calabar in Nigeria and St. Louis in Senegal. Another, on which it would be necessary to use amphibians, could be organized up the River Niger in Nigeria to Lokoja and thence by way of Minna Kaduna and Kano to Zinder, where connections could be made with the Franco-Belgian line across the Sahara to Europe. It would be possible for land 'planes to operate along the course of the River Benue from Lokoja for the 125 miles to Makurdi.

The surveyors found that, though there are good airports in Nigeria and at Bathurst, there are greater possibilities for seaplanes than for land 'planes. That part of the River Volta between Akuse and Adda in Nigeria was found suitable.

It is to be hoped, however, that the time is not long distant when the west coast of Africa will be developed as effectively and successfully as is the east route to the Cape.

CHAPTER VII

ADVENTURE IN THE SKY

I

DESERTS are mostly romantic in fiction. Certainly, from the air, their desolation has no appeal. Most airmen are glad when they have crossed these dirty yellow expanses, where a forced descent may mean death.

I have flown over the Libyan Desert, the Arabian Desert, and the Nubian Desert. I have crossed those steppelands of South Africa called the Karroo. I have flown over them in the blistering heat of the day and in the icy coldness of night. And, quite frankly, I have felt a great relief when the desert was past.

Yet these deserts have to be crossed every week by the Imperial Airways pilots, as well as the pilots of other airways. And it is remarkable how these desert airmen have learned to read signs of approaching storms, how to fly their machine to safety when conditions become hopeless, how to conquer every phase of the desert's wilfulness.

But the desert which has most terrors for the airman is the Sahara. More than one brave flier has disappeared in its hot embrace. This desolation of sand, which in area would almost engulf Europe, has a sinister reputation for the riders of the air. If a flier disappears, however, the wireless cackles and a dozen men and machines set out to search. Many a lonely French flier, his eyes tired from the glare of the sun, gazes down upon this dead part of the earth seeking the missing man and his machine.

Many English and American fliers have passed over that desert. Not very long ago I talked in Cape Town with the two Royal Air Force fliers, Squadron-Leader Gayford and Flight-lieutenant Nicholetts, who had sailed over it in their giant Fairey-Napier monoplane and achieved at the time the world's longest non-stop flight record.

"I hadn't time to look at the desert," said Gayford bluntly. "I was too busy with the machine. At the same time I breathed a sigh of relief when I was across it."

And so might say Mr. and Mrs. Mollison, both of whom have crossed the Sahara on different occasions. When Mrs. Mollison was flying south on her record journey she discovered that the tanks of her machine had only been half filled. She had to fly back to the desert post to replenish them. Mollison himself was forced down in the desert out of sheer fatigue. He stretched himself in the sand and slept for three hours. Then he set off again, and his supreme navigating skill brought him through.

There are moments over the Sahara when the sun and wind drive the civilization out of a man. An unreasoning madness seizes the flier. They call it *cafard* in North Africa. Even the most experienced aviators find themselves in the clutch of *cafard* at some time or other. I recall that brave young explorer, Sir Robert Alan Clayton, who subsequently died as a result of his flying adventures over the Libyan Desert, analysing a mad moment in the air.

"What with the terrible glare and the intense concentration needed," he said, "I lost all idea of height, position and speed. My head began to swim, and I had an almost unbearable longing to dive the machine into the ground and end it there."

Because of these things one can have nothing but admiration for those French fliers who fly across this route regularly to deliver the mails at Dakar on the West African coast. From Morocco the route is one for mails only. Passengers are not carried, and most of the flights are done at night, when there is less chance of any marauding Arabs firing at the machine in the sky above.

The French authorities have done their best not to make the Sahara route fashionable. Not only do they insist upon every aeroplane taking a ten days' supply of food and water when crossing the Sahara, but foreign fliers are asked to deposit 100,000 francs to defray any possible rescue costs. If a French pilot descends in the desert and is captured by the Arabs, there is much likelihood that he will be saved and brought into one of the air stations of the Sahara for ransom.

The price of a pilot is fixed. The French pay. It encourages the Arabs to shoot down any other machine they may see. But heaven help the airman who is not found by Arabs. Once he drops into that sea of sand death is almost as certain as if he had come down in the Atlantic.

A romantic, adventurous, but sinister air route. It was one desperate adventure that decided the French authorities not to permit passengers to be taken over this air route. Three men in an aeroplane, Pintabo, Erable and Gourp, were once forced down in the Sahara. A small army of Arabs materialized from the sands. There was no attempt at palaver. An attack was made, and Pintabo and Erable were shot dead at the first encounter. Gourp, with bullet and dagger wounds, still alive, was tied to the back of a camel. The journey was begun to Cap Juba, an air station on the coast, where the Arabs hoped to obtain a ransom for the aviator. But Gourp was so maltreated on the journey over the desert that he reached a point of suffering beyond human endurance. He swallowed a dose of iodine and carbolic acid which he had with him, and died just as he had been handed over to the French at Cap Juba.

One may talk with the French airmen at Colomb Bechar and hear morbid stories about the prolonged agony of death in the Sahara. There is, for example, the story of an army aeroplane that was transporting a general on a non-stop flight from Fez to Niger. The pilot had decided to follow that thin ribbon of track in the sand made by the Citroën desert cars that have blazed the route to Timbuctoo. This track is always difficult to see from above, as every aviator will admit, but to lose it usually means disaster. On this occasion the pilot lost it and, being uncertain of his direction, decided to land.

Usually landing in the desert is fairly easy; that is, if conditions are good and your eyes are not blinded by the glare and the sand. The pilot of the army aeroplane must have had a touch of *cajard*. He brought the machine down, ground-looped, and stood it on end. The shock of this crash landing smashed the general's shoulder.

The party of three—a mechanic was included—stepped out of the wrecked 'plane into the desert. It was then they discovered to their horror that the only water they possessed was

BY AIR

that in a water-bottle which at the last moment before departure the méchanic had thoughtfully filled and slung over his shoulder. They were marooned in a wilderness with just that one bottle of water.

There is no need to dwell on the agonies of those three men in the days that followed. The general was the first to die. He ended his life on the fourth day. The mechanic died on the sixth day. The pilot, according to the note he left behind, endured until the seventh day. A rescue squadron of military aeroplanes found the wreck of the machine and the three corpses a week later.

The trans-Saharan motor route has established petrol and water stations at intervals in this immense desert. A modern oasis with petrol tins instead of palms. But very necessary to the riders of the desert skies.

There is, for example, Bidon 5. All those who fly the Sahara keep an eye on the yellow expanse for this oasis. Bidon 5 may mean life or death to the aviator. And yet you will not find it marked on the ordinary maps.

In fact, when you first glimpse it—and only a tug at your sleeve by the pilot will reveal it to aching eyes—you wonder how it ever came to be created. You see what appears to be a piece of tin glistening in the sunshine. As you drone nearer to the earth, the glistening tin becomes two white-painted shelters and a white petrol-pump. A few petrol tins in the desert. An eternity of yellow sand and brassy skies about you. That is Bidon 5.

The last Arab that was left to look after this lonely post went mad. He was a one-eyed fellow named El Beshir. It was at first thought that he had gone mad through loneliness. But when he was captured—he had to be hunted by desert cars among those yellow dunes—El Beshir complained that there were too many visitors to Bidon 5. All the Arab wanderers of the desert knew this petrol oasis, and would visit it with their camels. There was a party almost every day.

Worst of all, according to El Beshir, was the bearded Tuareg with a flute. This old man persisted in playing his flute all through one night and every night. It was this that drove him crazy. He could not sleep. And whenever he heard

ADVENTURE IN THE SKY

the drone of an aeroplane in the sky Ei Beshir would run and hide himself among the dunes, leaving the luckless aviators smashing at the lock of the petrol-pump.

Eventually Ei Beshir was taken to Gao, a prisoner. Now he squats there, a miserable madman, complaining of the bugle that is sounded in the barracks at intervals.

"That bugle is sending me mad!" screams the one-eyed Arab.

There are many other strange stories told by the riders of the desert skies. Perhaps one of the most unusual concerns a deserter from the French Foreign Legion. This big strapping German decided he had had enough of the severe discipline of the outpost on the edge of the Sahara. He wandered into the desert and was eventually sighted and captured by the famous Blue Men, those wandering Arabs with the indigo robes.

The Arabs promptly searched the pockets of the Foreign Legion deserter. Among other small possessions they found a photograph. It showed the German as a private in the Prussian Guards. Naturally he had posed his best before the camera. He wore the magnificent helmet with warlike eagle, and the uniform was displayed in all its glory. That photograph impressed the Arabs. Decidedly the man they had found wandering helplessly in the desert was a man of importance. Within half an hour they were convinced that they had captured the Kaiser himself.

The chief of the desert warriors wrapped the photograph carefully in a shawl. Then he gave orders for the prisoner to be thoroughly beaten lest any of the spirit of the great Kaiser still remained. When the poor devil of a Legionnaire had been ruthlessly bastinadoed, he was thrust down a well for the night. The next day he was hauled up, beaten again, and thrown into the well for a second night. A few crusts of bread were thoughtfully thrown after him.

They did this, ironically enough, because they were frightened that their great prisoner might escape. It was essential to break his spirit. Already the chief of the Blue Men was lulling himself with dreams of the luxury ransom he would exact for his prisoner, the Kaiser. A few days later the Arabs resumed their desert wanderings, taking their prize with them tied helplessly to a camel.

BY AIR

At every oasis, at every chance meeting with other Arabs, the prisoner and the photograph were exhibited together. That splendid portrait carried conviction. It must be the Kaiser. The other tribes began to be envious. More, they began to offer to buy him. The price of the miserable prisoner increased every day. At last his original captors parted with him to another band of Arabs for a big sum of money.

This group of Arabs also trailed into the desert, with the half-dead deserter forced to accompany them. After some weeks he was sold again, for an even bigger sum. And on each occasion the photograph was sold with the prisoner. It was the photograph that carried conviction. Towards the end, it is said, one tribe of Arabs nearly bankrupted themselves buying the miserable German.

Eventually the Arabs took him to Cap Juba, the fortified post of the then Aeropostale in the Rio de Oro. He was taken under heavy escort in order that the negotiations for ransom should begin. And when the bartering Arabs entered the fort at Cap Juba, produced the photograph and demanded twenty thousand pounds for their valuable prisoner, they could not understand the laughter that went up from the Europeans. The Arabs muttered among themselves, shuffled their feet, and condescended to bring the price down to fifteen thousand pounds. They were again laughed at. In high indignation, they stalked out of the fort and went back to the desert. There they sat down and waited with their captive. They were convinced that the Europeans were bluffing.

But as time passed and no offer of ransom was forthcoming, the Arabs became desperate. Once more they entered the fort to parley, and this time offered the Kaiser for a miserable thousand pounds. The Europeans shook their heads firmly. The French officials had no use for German deserters from the Foreign Legion. They refused to pay a sou.

The Arabs could have screamed their rage. The credit of the whole tribe had been pledged to buy a prisoner who was now worthless to them. They went back to the desert, dragged the poor fellow forth, gave him another sound thrashing, and then resumed their travels. Although they now hated the sight of their captive Kaiser, they still took him along. At long last,

ADVENTURE IN THE SKY. 175

so the story is told, they sold the German for forty francs to one of the airmen of the Aeropostale. It was the most they could get for him. That incident nearly ruined the business of banditry in the Sahara for ever.

Nowadays the regular mail 'planes that cross the Sahara usually carry an interpreter with them. It is the interpreter's duty, if the 'plane is forced down in the desert and captured by Arabs, to act as a go-between of the pilot and mechanic and the warriors of the sands. It is he who explains that a substantial sum will be paid providing the men and the mails are safely handed over at the nearest outpost.

It is not generally known that all the regular commercial pilots who fly over the deserts of Arabia and Persia carry in their pockets a special card printed in three native languages announcing that ransom will be paid for their safe delivery. It has saved more than one British pilot's life when a forced descent has brought him among warlike tribesmen.

It is so dreadfully easy for an airman to get lost in the desert. It is so dreadfully difficult to discover him from the air. Anyone who has flown over desert country will emphasize the difficulty of discerning anything moving across this interminable yellow expanse. I have known military aeroplanes, sent out on manœuvres with desert convoys which include armoured cars, flying in circles for half an hour over the convoy and not being able to see them on the sands.

Because of this, pilots who make a forced descent are warned not to wander too far from their machine. It is easier to glimpse a machine with the sun glinting upon it, than it would be to see a man or beast moving below. Cases have occurred where an aeroplane has been found derelict in the desert. Days later the pilot's body has been found only a few miles away, and track marks have shown that, probably chafing at inactivity, he wandered off in the hope of reaching a village and walked unknowingly in circles.

Although many stories are told of the adventures of the Aeropostale men in the desert, little is known of their astonishing adventures on the other side of the Atlantic. French writers such as Saint-Exupéry have done much to record some of the epic flights over the Andes of South America. *Vol de Nuit*,

BY AIR

in which Saint-Exupéry gives a glimpse of the agony endured by those on the ground while waiting for those in the air, is already a classic of the air.

Paul Morand, another brilliant French writer, has done something to record the achievements of these fliers over the Andes. It is not merely the route that makes for the dangers, it is also the machines. Paul Morand sadly admits that in South America many of the French machines are ten years behind those used by the Americans. As an English admiral once said to him: "In France you have some of the best navigators in the world, and the worst machinery ; and your bad machinery is never improved until it has killed off your good personnel."

There are dangers in plenty on the South American route. Terrible belts of fog, torrential rains so heavy that wooden propellers are finished in one trip, and in certain mountainous regions the worst visibility in the world.

Paul Morand tells of the adventures of Mermoz, surely one of the finest aviators in the world. In 1929, in the teeth of a storm that broke every cable in Buenos Aires, that sank every vessel at anchor and drove the *Lutetia* out to sea, Mermoz arrived according to schedule at Rio.

According to Morand, Mermoz regularly attacks the Andes, a sky climb that necessitates his going to 15,000 feet in a machine that has a 12,000-foot ceiling, and with nothing but luck and his own judgment to guide him, relying on rising air currents to bear him higher to an altitude that his engine cannot attain. His wheels scrape by no more than sixty feet above the peaks. The first puff of wind would force him down into the snow and carry off his landing-gear.

With neither provisions nor wireless, Mermoz and his mechanic, in twenty degrees of frost, once spent three days and nights patching up their machine with wire ; on the fourth day they pushed it for eight hours to the summit of a two-thousand-foot slope and then flung themselves into the void, voluntarily toppling over a precipice, rising again, and just missing the further brink to make a three-point landing on the other side, and so on down to Buenos Aires, where masses were already in progress for the repose of their souls.

ADVENTURE IN THE SKY 173

In 1930 Mermoz was flying the *Comte de la Vaulx* across the Andes. The pilot was forced to land in the middle of the mountains, on the very edge of a precipice. Mermoz remembered that his passenger, still lame from a recent accident, could not jump from the machine while it was in motion. Mermoz therefore flung himself beneath the wheels of his machine, used his body as a brake, and smashed two ribs.

Then there is Henri Guillaumet, who was caught two years ago by a hurricane of snow over the Chilean craters. He sought in vain for a gap in the clouds, turned as his petrol was giving out, and crashed in a totally deserted region, the *Laguna Diamante*, twenty-four hours on foot from the nearest village. He fell into ravines, dragged himself through avalanches, and fashioned a shelter in the snow with the door of his machine for spade. His provisions were lost, his shoes were gone, and he wrapped his frozen feet in strips of parachute.

Four days and nights he went without sleep, bereft of all his possessions, wandering through the darkness by the light of his pocket-lamp. When this gave out, he fell exhausted, resolved to rise no more. But then he thought of his wife, and the insurance company that would not pay unless his body was found, and with his last strength he dragged himself on to a rock to die in as conspicuous a place as possible. From that small eminence he saw an Indian cabin, and crawled towards it. An Indian woman who saw this strange beast arriving on all fours and browsing in the grass, fled. The other mountain dwellers took him in and he was saved.

There are other magnificent epic stories to tell of these pilots of the *Aeropostale*. But their adventures are all in the day's work. During 1930 Barbier specialized in night-flying between Buenos Aires and Rio. Depecker, on the Argentine-Chile route, saved all the passengers in his blazing machine by his presence of mind. Reine, after his adventures among the Arabs, established the Paraguay line alone. Colin-Jeannel, sometime lawyer and now chief of the French Air Services in South America, made over the jungle of Columbia, Ecuador and Venezuela a reconnaissance that Lindbergh himself, though in less favourable weather, succeeded in carrying out but partially.

A desert which has claimed more than one brave flier

smothers a good deal of Central and Western Australia. Yet, like all no-man's-land, this desert has its stories of hidden gold and has appealed to diggers and the modern prospectors by aeroplane.

I have heard again and again the story of Lasseter's gold in this desert. Lasseter himself died in search of it, as also did many other lone prospectors. The Australian desert has a cruel reputation. In December last year three men in an aeroplane set off to find this lost reef. They were confident that their machine would conquer all desert difficulties. Their subsequent amazing adventures became an epic in the Australian Press.

It was more than thirty years ago that young Harry Lasseter lost himself "somewhere out there" in the Australian wilds and stumbled upon a reef with "yellow stuff in it as thick as plums in a pudding". Lasseter died on his second expedition after terrible privations, his last hours of agony being related in messages found buried beneath his camp fires. But others were not deterred. Many other expeditions set out to find Lasseter's Lost Lode. None of them was successful. Some proved fatal.

The general opinion is that the gold reef lies in the Granites, 400 miles north-west of Alice Springs. It was to this arid area that the three men in the aeroplane set out one day in December 1932. The adventurers were Mr. H. Baker, who was acting as pilot, Mr. N. S. Stuckey, a mining engineer, and Mr. Patrick Whelan, a veteran bushman.

Over sand-dunes and salt-lakes of the desert, hundreds of miles from any civilized outpost, a leak developed in the oil-pipe of the aeroplane. Baker decided to land. He chose a dry bed of a salt-lake that looked easy enough for an emergency landing. But as the machine glided to earth it caught some obstruction and overturned.

None of the three gold-seekers was hurt, but their plight was desperate enough. The propeller was smashed, and, although they possessed a spare one, the aeroplane itself was too heavy for the three men to lift and right it. After several vain efforts, they sat down in the sand, exhausted, and stared stupidly at the machine which was their only means of escape from death in the desert.

After a time, however, the wind changed. It was then that the pilot noticed the machine moving. The wind was partly

lifting the 'plane. He yelled to his companions, and once again they began to struggle with the machine. The wind helped them. At the end of the first day they had managed to right it once more.

Even so, the 'plane presented a sorry sight. The wings were badly damaged, and one hung loose. It was a job for a repair shop, not for three men lost in the desert with only very limited supplies of water and food. But the job had to be tackled. It became a race between time and death. Day after day beneath the cruel sun Baker drove his two companions to work like blacks. They had to work in the sunshine. When darkness came the work had to be abandoned.

This repair job in the desert was surely one of the most remarkable in the history of aviation. With nothing else available, the prospectors in desperation hacked branches off mulga bushes, and by dint of considerable ingenuity succeeded in strengthening the damaged wings. With strips cut from desert saplings and rawhide thongs from their water-bottles, they completely "bandaged" one of the damaged wings. Rents in the fabric were sewn up with ordinary thread; and, in the absence of the "dope" which is normally used to tauten aeroplane fabric, Baker used some slimy mud from the bottom of a dried-up water-hole.

And while they were working desperately to save themselves, these three men had the ironic experience of seeing an aeroplane droning overhead in search of them. They shouted, they waved, they ran shrieking through the sand in pursuit of that aeroplane. The pilot never saw them. Yet he had been sent out to search for them. When no news had been received of the expedition, the worst was feared, and a rescue aeroplane set out. But the rescue 'plane returned without having sighted the three men and their machine against the yellow sand.

The prospectors continued their struggle with the aeroplane. They had rationed themselves severely on food and water. They were nearing the end of their supplies. But they had managed to build up something out of the pieces of bush. The aeroplane was ready to take the sky.

But another terrible problem confronted them. In replacing the light hollow spars with solid branches, they had so

added to the weight of the machine that it was unable to carry the three men. Two at the most could go. One must be the pilot. One would have to stay in the desert. Two men looked at each other. It was Whelan, the veteran of the bush, who decided.

"Av, I'll stay!" he growled. "What's another day or two in the desert, anyhow?"

It was a brave decision. Even so, the two men who were going off in the crazy machine were risking their lives. If they crashed and killed themselves, Whelan would be left alone to die slowly. He squatted in the sand while the two men climbed aboard.

A wave of the hand, a splutter from the engine, and the machine began to taxi across the salt-pan. Would it lift? It seemed to travel with maddening slowness. Whelan gazed anxiously. Slowly the wheels lifted from the ground. The machine was up. It swayed dangerously for a moment. The pilot was eyeing those patched wings, his face set. But they held. Baker pointed the nose towards the blue sky, circled over Whelan, and then set off for the nearest civilized outpost.

Their petrol supply was dangerously low. It was doubtful whether they would reach the town of Forrest, which was their objective. And then, after half an hour's flying, the repaired fabric of the damaged wing began to tear.

Baker could make no move to repair it. As well as piloting the 'plane, he was pumping petrol to the engine. So it was left to Stuckey, the mining engineer, who had never been in the air until this adventure, to scramble out on the wing of the machine in mid-air and stuff his shirt in the hole in the fabric. The shirt did the trick. It stopped the wind from widening the rent.

Two hundred miles they flew. The people at Forrest were astounded to see a machine with wings patched with branches of trees ingeniously bound with leather and rope, gliding from the sky. The two exhausted men stepped out. In a few words they told of Whelan left alone in the desert.

A relief aeroplane was soon on its way. By good fortune the pilot located the old digger. At the time he was seen, Whelan had no food. Two gallons of water was all he possessed. Even

then, the pilot dared not land. Apart from the fact that Baker had crashed when coming to earth on this salt pan, it was nearly evening and the light was bad. The pilot was able, however, to drop food by parachute. Then he returned.

The next day the aeroplane went back to the stranded digger. This time a landing was made, and the pilot was able to shake hands with the man who had elected to stay behind in the desert.

"Well, how are you feeling?" the digger was asked.

"I was just getting to feel a little lonely," was Whelan's only comment as he stepped into the aeroplane that carried him back to civilization.

It was this same area that witnessed another drama of the desert. It happened in the early days of 1931, when two airmen were brought to Alice Springs in a weak condition after three weeks wandering about the desert seeking help. The two men were Captain Pittendrugh, who was a British war pilot, and Mr. Hambro, a mining expert.

These two adventurers believed that they were going to meet the original prospector, Harry Lasseter. The whole expedition seems to have been wrapped in mystery. Captain Pittendrugh said that on December 20, 1930, he took off from Alice Springs with Mr. Hambro for Ilbilba.

At Ilbilba they were to meet Mr. Taylor, the manager of a gold exploration company, who would give them sealed orders telling them where to find Lasseter from the last depot which he had used on Lake Christopher.

These special precautions were being taken to elude parties with camel teams who were anxious to follow the exploration party through the desert and possibly forestall Mr. Taylor at the gold reef. The police had been holding back these parties.

Captain Pittendrugh, however, failed to find Ilbilba in his plane. He determined to return to Alice Springs, but the petrol supply gave out and he landed among scrub. The machine was not damaged, but the scrub made it impossible for the airmen to take off again.

Captain Pittendrugh's diary shows that the airmen propped their machine and tied it down; then they decided to walk to Alice Springs. They were carrying five tins of mixed meats,

16 milk tablets, 12 biscuits, and four gallons of water. They also had with them a net to guard them from mosquitoes.

At the end of three days they reached a "soak" in Dashwood Creek, near Mount Zeil. Rain had recently fallen; there was water, and they encamped.

Then follows a record of eleven days during which they were husbanding their food as carefully as possible until it was all used up. The heat was fierce, but they spent the days searching in the neighbourhood of the camp which they retained as their headquarters. At one stage during their isolation, when they were in danger of thirst, a rainstorm replenished the "soak".

Day after day they waited, gradually growing weaker, but finally they were sighted by a searching 'plane. This machine dropped a message to Mr. Giles, a grazier on the Dashwood River, asking him to enlist the aid of natives. Mr. Giles organized a party, which reached the lost airmen a few hours after they had been sighted.

Jottings in Captain Pittendrugh's diary tell the dramatic story of the airmen's plight during the last days :

January 3.—Two Royal Australian Air Force 'planes came in sight, but we failed to attract their attention.

January 8.—We erected a flagpole on adjacent hill.

January 9.—Two tablets left. Flies and ants awful.

January 11 (3 p.m.)—Three 'planes overhead, dropped foodstuffs, cigarettes.

January 11.—Mr. Giles and party arrived. Left for Alice Springs.

The two airmen at Alice Springs subsequently recuperated after their twenty-one days' ordeal by heat and thirst.

Although at least three big commercial air lines, French, Dutch and British, cross the Arabian desert to Bagdad these days, the desert sometimes wins. A year ago a French air liner flying from Damascus to Bagdad met with disaster. The three occupants—the Swiss president of the League of Nations Commission on the delimitation of the Irak-Syrian frontier, the French pilot and his mechanic—were all killed.

The machine encountered one of the terrific sandstorms, and was driven low and crashed into a sand-hill. When sandstorms are loose in the desert, the various outposts send warning by

wireless. This particular machine was not fitted with wireless, and it had been impossible to warn the pilot of the approach of the storm. When the air liner failed to arrive, R.A.F. 'planes immediately set out to search the desert. Eventually they discovered the wrecked machine and brought the bodies of the unfortunate victims to Bagdad in one of the 'planes.

But still the air riders of the desert continue the day's work. Aeroplanes are now helping in the laying of a new pipe-line across the desert from the oil wells of Irak to Palestine and Syria. Not only do the machines transport engineers from point to point, but they are also used in surveying for water.

Royal Air Force 'planes in particular find a variety of work awaiting them in the desert. They have been ordered to convey surgical aid to sheiks in the deserts of Irak and on the inhospitable shores of the Persian Gulf. They have carried to remote villages anti-cholera and anti-typhoid vaccines.

The bane of the regular desert-fliers, however, are the limelight seekers of notoriety. Pilots intent only upon record-breaking are apt to take chances where no chances can be taken. I have already revealed how the French safeguard themselves by insisting upon a big money deposit by those fliers crossing the Sahara. Strict regulations are also enforced by the British authorities on those who would cross the Sudan.

Why has the Sudan such a bad reputation among fliers who wish to break records? Why do the military authorities deliberately hold up women fliers and refuse to allow them to continue except under escort?

Some women fliers have more than once been outspoken regarding what they term official red tape. Moreover, two English girls, flying to the Cape recently, were held up for over a week in Khartoum before they were permitted to proceed. What is the reason for this attitude?

I asked these frank questions of a high official in the Defence Department in Khartoum and received equally frank replies.

"The only reason why we refuse to allow women aviators to fly south on their own," said the official, "is because a forced landing means real danger."

He unrolled a map of the million square miles that constitute

the Sudan, and pointed to a network of waterways and lakes.

"That is one of the worst swamps in the world. It is known as the Sudd. If a woman flier—or any other flier for that matter—came down in that area, they would be like flies on a flypaper—unable to get away. The woman would die a slow agonizing death by insect bites.

"It is not that we doubt the ability of these women to fly or the airworthiness of their machines," went on the official. "I should like to say, however, that many of them have not had sufficient tuition, and the state of their machines is often appalling. But they are flying over territory where we use aeroplanes for military and punitive purposes. You can't expect the native below to distinguish between military aircraft and civil.

"A native in these particular areas looks up and sees an aeroplane in the sky. And although I do not say that the native will fire upon the machine, should it land he will not hesitate to treat the occupant as a prisoner. In these parts a woman is worth only two goats, and would be promptly exchanged for them if there were any offers. That might be humiliating for some of these fliers."

The official went on to point out the enormous difficulties that present themselves to the R.A.F. if they have to rescue fliers in distress. There is only one squadron of the R.A.F. in the Sudan, and this one squadron has not only to police the million square miles and carry district commissioners to outlying posts, but it is also engaged in a regular warfare with those Abyssinian raiders who cross into the Sudan in search of slaves.

To search this wilderness of desert for any marooned fliers who can only vaguely describe their position is a task of many days. Moreover, should a flier come down in the Sudd region, he or she might as well blow out their brains. A little food might be dropped by parachute, but that is all. No machine dare land there, and it is impossible to penetrate certain parts of the Sudd even by boat.

I winced as I thought of a recent flight we had taken over the Nubian desert, abandoning the Nile for an exploration of that desolating wilderness. From the air one realizes that a

ADVENTURE IN THE SKY 151

descent means the end. It is a curious fact, too, that the heat radiations from this desert are so great that a machine in the air is constantly tumbling and side-slipping.

On one occasion we dropped 500 feet, and the wireless operator was helplessly air-sick. Sometimes those heavy troop carriers of the R.A.F., the Vickers-Victorias, carry soldiers across this desert. Very often the troops, and sometimes even the pilots, are air-sick. And there is rarely a breath of wind to disturb the surface of the sand.

Another curious factor is the existence of blind wireless areas above this desert. Again and again our operator, when flying, tapped the ether unavailingly. It gives one a feeling of eerie isolation.

"We are now preparing definite regulations regarding private fliers over the Sudan," said the official. "These regulations have not yet been approved by the Air Ministry, but the fact that the Sudan has become a sort of African Clapham Junction of the air necessitates their early approval.

"Anyone wishing to fly over the Sudan has to apply for permission. As regards women fliers we insist that they either take a male passenger in their 'plane or else be escorted by an R.A.F. machine. It is not enough that they follow an Imperial Airways liner or decide to accompany an R.A.F. machine on some Government mission. The escort must be definitely arranged.

"Like certain other countries, we could tell these fliers that they cross our skies at their own risk. But we refuse to do that. In common humanity we must do our best to rescue any flier who is in distress, and because of that obligation we must insist upon our regulations being observed."

Even as we talked an application was received from a German girl-flier who wished to fly from Khartoum to Addis Ababa in Abyssinia. The girl's qualifications as pilot were excellent, but, like many other aviators who come to this country, she was ignorant of the terrain over which she was to fly. A huge range of mountains several thousands of feet high marked the frontier of Abyssinia and the Sudan. Was her machine capable of flying that barrier? Nobody knew. The official sighed, and scrawled across the document the official insistence upon an escort.

Treasure-ships are now sailing the skies. Gold, diamonds, radium—even the hard-bitten prospector who once tramped the wastes with billy-can, a packet of tea, some sugar, and a spade—now take wings. "Pigs might fly", said the sceptical up to a few years ago. To-day they do, and gold and pianos, diamonds and milk, fly with them in high-powered aeroplanes.

There was an occasion when I descended in an aeroplane in a place in Africa which was not then marked on the map. The place is Mbeya, in Tanganyika, and it consists of a few native huts, the bungalow of a magistrate and a mud-built hotel where, according to tradition, a notice in the bedroom informed you that "Gentlemen going to bed with their boots on will be charged extra for the linen"!

A night in that hotel is like a chapter out of Bret Harte. It is one of the outposts of civilization nearest the Lupa goldfields, twenty-five miles distant. Those twenty-five miles have to be walked through the bush. There is no road as yet. And when the diggers reach the hotel they are naturally thirsty. They all troop promptly to the bar. There they are received by Jim, the barman. He is quite used to taking over the counter cigarette-tins filled with small gold nuggets as payment for drinks.

"When that tin's finished, let me know," one digger said.

Jim weighed it in his hand.

"It'll probably last you a week," he assessed cynically, and reached out for a brandy-bottle.

The digger sighed as he settled himself in a chair.

"When I first met Jim I imagined that I had at last found the hero of my boyhood—Captain Kettle. He was Captain Kettle gone grey—the pointed beard, the fierce, challenging eyes, the rumbling voice. If only he had spluttered, "By James!" I would have tried to converse intimately of Methodist chapels and cough cures. Instead, he shattered my illusions by saying:

"The sea! I've almost forgotten what it looks like. I've not seen it for ten years."

Jim is a father-confessor to all the diggers from the Lupa goldfields. He is also the unofficial postman, the fellow who



[Photo by courtesy]

[Wide World Photos]

AIR-COMMODORE SIR CHARLES KINGSFORD-SMITH

has several cigarette-tins all neatly tied up in brown paper and string, and addressed to the Standard Bank of South Africa in London—the hard-earned gold of many of these diggers. This was the gold which our aeroplane was to carry to London, and the next morning we left for the north with £10,000 worth in the cabin of the machine. The Lupa goldfield has had little publicity as yet, but from the figures shown me the output is mounting steadily month by month, and great things are expected in the near future.

This is just one example of how treasure is being carried through the wilds to-day. The aeroplane is the safest form of bullion transport. Those buccaneers who robbed the gold trails, harrying the laden miles of the Spanish conquest routes, would find it difficult to filch from the argosies of the air.

Yet even bullion has disappeared into thin air. Only the other day bullion valued at £4425, being taken by air from Bagdad to Croydon, disappeared in transit. Somewhere en route—most likely in the train journey between Brindisi and Paris, gold thieves extracted the bullion. Aeroplane companies admit that an international gang concerning themselves with these treasure-ships of the air are now at work, and so far have evaded detection.

But the carrying of bullion by aeroplane is still the safest as well as the quickest of all forms of transport. Not very long ago, during the gold crisis on the Continent, eight specially chartered aeroplanes, carrying between them twelve and three-quarter tons of gold, arrived at Le Bourget, Paris, from Amsterdam. This was the largest gold consignment ever transported by air in a single day.

The eight aeroplanes from Amsterdam landed with strict regularity at intervals of a quarter of an hour, and their golden cargo, valued at over a million pounds, was stowed away in fast motor-vans and rushed to the Paris banks. Each motor-van had a heavily armed escort.

Aeroplanes are also used for the transport of gold between Britain and France. One may walk on the tarmac at Croydon and see a triple-engined Imperial Airways machine, stripped of the chairs in its passenger cabin, standing with its engines warming up outside the hangars.

An uncovered, unguarded motor-trolley draws up and the aeroplane porters load some dozens of little boxes into the aeroplane. For their size, those boxes seem to be very heavy. But then, that is because each of these boxes contains gold bullion.

It is all done casually. There does not appear to be a policeman in sight. Two men in lounge-suits might be detectives, but one cannot be sure. And the whole of this load of gold has probably come to Croydon from the Bank of England vaults in a conveyance about as impressive as a grocer's van.

What are the precautions taken against aerial buccaneers? For one thing, no passengers are carried on these specially chartered bullion aeroplanes. It would be impossible for a gang to secure seats and then mutiny above the Channel. Moreover, the pilot is in constant wireless communication with Croydon and Le Bourget. Should a pirate 'plane come from behind a cloud he would be able to gasp the news to the aerodrome. Very soon there would be a skyful of 200-miles-an-hour fighters on the heels of the gold pirates.

When the air liner *City of Liverpool* came down in flames near Dixmude on March 28, 1933, a number of gold ingots consigned to London fell in the fields at a distance from the wreckage. Several were recovered, but the remainder could not be found, and a reward was offered for their recovery.

Then a physician living at Handzame, near Dixmude, was puzzled by the queer behaviour of a peasant of Wonven, called Knits, and suspected him of having found the ingots. The physician expressed his suspicions to the police, who promptly searched the house of Knits and discovered gold bars hidden under logs of timber stored for heating the home. Knits confessed to having picked up the ingots at the time of the catastrophe.

Even the gangsters of America have not been able to devise a sure method of looting the treasure-ships of the air. Bullion is regularly transported by aeroplane in the United States. As a rule there is little or no indication that a particular 'plane is carrying an unusually valuable load; even the officials at the 'plane's destination sometimes do not know that one shipment is more precious than another. When the 'plane is getting ready to start, a few plain-clothes men may mingle

with the crowd waiting at the field, but there is no display of armed strength. The pilot wears a revolver, as usual, but generally does not carry a guard, and is not more heavily bonded than when entrusted with bags of ordinary mail.

The treasure-ships of the air proved themselves during the recent banking crisis in the United States. When the moratorium was declared it was found necessary for business houses to make payments in many parts of the country, and, under the circumstances, cash had to be used. Aeroplanes were commandeered for the purpose.

The Transcontinental and Western Air Companies sent out special 'planes, closely guarded at the terminals and flown by armed pilots, loaded with gold and currency. When the new notes were issued in Washington their distribution was spread broadcast over the country by General Air Express. It was the general opinion of economic experts that the speed of air transport had shortened the moratorium by several days.

There is one bank in Reno, Nevada, which was saved in dramatic fashion by a bullion-carrying aeroplane. During the recent crisis the Governor of Nevada proclaimed a fortnight's holiday for all the banks in the territory, and a general moratorium. Only one bank, Reno's biggest, dared to scorn the proffered relief, hoping its customers' confidence would ensure its safety.

It was mistaken. From the moment its doors opened the counter was packed with panic-stricken customers clamouring for their deposits back. Only one measure remained to save the bank from ignominiously closing down. The bank's chief sent out an urgent appeal to a city in a distant state for gold to be sent at once by aeroplane.

As the S.O.S. was sent out, the cashiers of the bank began paying out the customers, slowly and meticulously, in the very smallest possible coins. The aeroplane in the meantime, carrying a cargo of £200,000 in gold, was battling its way across the wind-swept peaks of the Sierra Nevada. Something like a hurricane was raging, but the pilot fought every mile of the perilous route. The cashiers at the bank had exhausted their small currency and almost given up hope when the aeroplane finally landed at Reno with its precious cargo.

But it is the gold-pro prospector, the man exiled in bush, jungle, desert and snow wastes, who has cause to bless these treasure-ships of the air. The aeroplane is now indispensable to the modern gold-seeker. A few months ago, when I was on the Kakamega goldfields of Kenya I heard the arrival of the first aeroplane. It was a two-seater Moth, which managed to land on a piece of ground that no one would have considered of the slightest use as an aerodrome. These brave pioneers by air were warmly cheered as they stepped out of their machine.

But the most remarkable results of gold-prospecting by aeroplane can be seen in New Guinea, that mysterious island in the East Indian Archipelago. A few years ago, beyond the jungle and three high ranges of mountains, gold was discovered at a place called Wau. The difficulties of reaching the goldfield were enough to deter even those hardened prospectors who will face anything for their long-dreamt-of "crock".

The intervening jungle, with its fierce cannibal tribes and pygmies, its wild beasts, fever swamps, and the mockery of beautiful birds of paradise flitting its dark forests, ate up more than one expedition. To carry a few pounds of stores from the coast to the mines took native bearers more than a fortnight, and as these mines needed heavy machinery for crushing and dredging, the problem seemed insuperable.

Then an aeroplane arrived. It was only a single-engined fabric and wood machine, carried from Australia to New Guinea by steamer. But it served. A landing-ground was cleared on the coast and another in the mountains. Then one morning a pilot soared into the sky with his machine. In less than an hour he had achieved the journey that had taken the pioneers a fortnight to traverse.

The gold-miners cheered as this first argosy arrived. It brought them stores, mechanical equipment, newspapers and mail. The aeroplane became their link with civilization. Actually a mining town began to be transported by air from the coast to the jungle. A small hotel was carried by sections, then pianos, billiard tables, and even the first motor-car to be seen in those parts. And by return the aeroplane brought the gold taken from the mountain ranges and transported it over the jungle to the waiting steamer at the coast.

Of course, the tropical climate soon proved too much for the fabric and wood machine. All-metal planes were then tried, and proved wonderfully successful. Very soon a fleet of large Junker freight planes were at work. In a year and a half these planes have carried across jungle and mountain range, piece by piece, a weird variety of articles, including two complete dredges weighing 1200 tons each; a 4000-kilowatt hydro-electric plant; complete machine-shop equipment, boilers, air-compressors, steam-engines for power requirements, two complete saw-mills, caterpillar tractors, road-building machinery, and small tools amounting to more than 4000 tons in all.

Not so very long ago one of the veterans of the Imperial Airways service was sent out to New Guinea to help in this gold-carrying. This aeroplane, formerly known as the *Hampstead*, had carried hundreds of passengers safely across the Channel between Croydon and Le Bourget.

The *Hampstead* was a sixteen-seater and therefore admirably spacious for carrying gold ore. She was shipped out in sections and re-erected at Port Moresby. This re-erection was a difficult task. The engine, fuselage, wings and so forth had to be unloaded on to lighters in the bay and then transferred to a piece of ground inland. An English pilot had been sent out with the old air-liner, and he showed the natives some remarkable ascents from spaces which were deemed impracticable for taking off. Her regular flights between the goldfields and the coast has done much to further British aviation in this part of the world.

A few years ago Wau was a tiny inaccessible village buried in virgin forest. To-day it is a busy township, containing over 1000 white men, together with several thousand natives, their needs being supplied by these aeroplanes that fly over the mountains, the rushing cataracts, and the impenetrable swamps. To keep this air line working, the operators have had to rely for most of their labour on black "boys", former head-hunters, whose manner of living is primitive in the extreme. They are recruited from the mountain villages by payment of £1 a head, in addition to a spoon, bowl, blanket, and trade-box, worth in all about another pound. Sometimes when they have received these advances they take to the hills again, but for the most part work out their contract.

Again, in the desert heart of Australia, at Alice Springs, aeroplanes raced with prospectors when the news came that the Government had proclaimed the goldfields open. Alice Springs is no will-o'-the-wisp discovery. Gold was found there thirty-two years ago, but the hostility of the aborigines and the cruel precariousness of water supplies were a damper on would-be engineers and prospectors. The aeroplane has altered all that.

In the Canadian and Yukon snow wastes, where the hunger of big cities for gold has sent the prospectors digging and blasting once again, the aeroplane is proving itself as the modern argosy. It is the newly discovered gold-mines of the Far North that have done more for Canada's air services than any other industry. Now a network of air lines connects the gold-workers' camps of the Far North with the big centres of Quebec, Ontario and Manitoba. Where the aeroplane has been pressed into service for the gold-mining groups the results have been wonderfully successful. Authorities are agreed that the aeroplanes have accomplished in one year what the old dog-teams, mushing through the snows, would have taken twenty-six years to accomplish.

Apart from the fleet of aeroplanes owned by the mining companies in Canada, several commercial prospecting concerns have been established which will undertake aerial surveys and the preparation of mining camps. They will send their men and 'planes into regions hitherto believed inaccessible.

Some exciting adventures have occurred through the rivalry of these air companies. It is still accepted that the first man to stake a claim has all rights to it. In Canada to-day claims are being staked out by pilots and prospectors in aeroplanes. These claims are usually pegged on behalf of clients in distant townships. It is only necessary for some of these keen-eyed pilots to mention that he crossed a range of hills that looked like gold-bearing land for 'planes to race in that direction with pegging crews as once dog-teams rushed for distant Eldorado.

One commercial pilot, flying a Canadian route, noticed one day that the country beneath his machine had what appeared to be a crack in it. This crack ran into a very shallow lake. His trained eye told him that it could be only one thing—

gold-bearing rock. He jotted down the particulars of the locality and made a report on his return. Within a month mining camps were at work around the lake, the men and equipment having been brought by air from a distant railhead.

For the goldfields of Northern Canada, miners, tools, supplies, dogs, and even the sleds are often carried by air. The 'planes, sheathed with skis, land on a frozen lake. From this point the dog teams set out. The 'planes are left behind, motors are drained of oil and covered with tarpaulins. They are anchored to the ice by pouring water on the skis and freezing them to the surface. Before starting on the return journey, oil is heated and poured into the motors. All these new fields in Canada have had an effect upon the economic output of gold. To-day Canada surpasses the United States in gold production and is second only to South Africa.

The Labrador hinterland, too, has recently been opened for gold prospectors by aeroplane. Preparations for the opening of the new goldfield in a region known as Seven Islands were fanned to fever heat in the spring this year when the announcement was made that assays of quartz from Labrador yielded 104 ounces of gold to the ton.

The new goldfield in Labrador is being leased out by the Newfoundland Minister of Mines and Agriculture. Forty square miles of territory have been set aside. Already three large companies have been formed to exploit the fields and work the holdings, and Captain Bondurat, to whom a tract of land in the gold area has been leased, has made several experimental flights over Seven Islands. Canadian Airways is using several big 'planes in this area for the transport of geologists, prospectors, pressmen, and all the strange followers of gold camps in the wilds.

Alaska, too, now sees its gold cargoes going by air. And those miners whom Jack London, Rex Beach and Robert Service have fictioned as grim he-men of the snow wastes—they too travel by air. In the close confines of a crowded cabin of Alaskan Airways, sourdoughs and half-breeds rub shoulders with doctors, missionaries and mining magnates.

Flying over the Alaskan wastes is probably one of the most difficult air tasks in the world. The pilots go aloft ready

for all emergencies. Through the six-hour twilight that is Alaska's only daylight for seven months of the year they race to distant camps.

Perils lie over and beneath the endless blanket of snow. It is often impossible to guess the altitude in that strange half-light when sky and snow blend without an horizon. The pilot circles over a possible landing-ground. He glances at the skis beneath his machine. Then he casually tosses his coat overboard, to gauge his landing. Finally he slides his machine to earth.

A sudden snowstorm may sweep him to earth. He may find himself fighting for life against a temperature ranging from 60 to 70 degrees below zero, and not only has he to see his passengers safely camped for the night, but he must secure his beloved machine against frost and storm. And the next morning may see him crouched beneath the tarpaulin for over an hour using a spirit stove to warm the engine into life and another to warm the oil; and one hand has to be ready with a fire-extinguisher to prevent the stove setting the aeroplane ablaze.

These machines bound for the gold-mines of Alaska carry queer cargoes. Fresh meat, live sucking-pigs, dress goods and household utensils are among the usual demands. They are ordered by wireless from distant camps. Sometimes these camps are so situated that an aeroplane cannot land. The goods are then dropped by parachute with an attached streamer to call attention to its resting-place.

The old gold-prospectors living in tiny cabins and expecting to strike rich one year are sometimes missed when their monthly visits to the nearest township cease. Officials become anxious. A pilot is asked to look the old fellow up. The aeroplane takes off. In an hour or so the pilot returns.

"The old sourdough's all right," he says. "There's smoke coming from his chimney, and I saw fresh tracks around his cabin."

But should there be no sign of life for the pilot hovering above, then a dog team sets out with medicine and food for the old prospector. Even in these snow wastes human life counts a great deal.

Owing to the wasteful competition that developed between

the various air services linking the mining camps with civilization, it was decided to group as many as possible. In this way came into being the Western Canada Airways. This company does more than help the mining community. Its value to the public generally is immense.

It is not actually possible to give all-the-year flying service because of the rigorous climatic disadvantages. The freeze-up and the break-up are periods when it is impossible to get 'planes away or for the machines to land. But this slack time is by no means wasted. It is obvious that the aeroplanes must be in the best condition for work, and so the non-flying periods are utilized to bring the equipment up to date. Everything that can be taken to pieces for careful inspection and overhaul receives attention.

What is known as the Icy North is thoroughly explored by aircraft during the summer months. The light aeroplanes employed make their own provision and fuel dumps, and these are so frequent that the 'planes are able to operate with the utmost confidence, knowing full well that they are always within comparatively easy reach of supplies for men and machines. No fewer than 150 prospectors for mineral wealth are kept busy in the summer months, and some most useful mineral discoveries have been made in Ungava, previously regarded as a forbidden and inaccessible region.

A small number of prospecting companies for several years have carried out in the wilds of the Canadian North a series of flights that represent one of the greatest feats of exploration ever made. They have crossed and recrossed the north-west territories from their southern limit to the Arctic coast, from the Mackenzie River to Hudson Bay—an area that a few years ago had hardly been seen by the white man.

During the past three years from seventeen to twenty-four pilots have carried on their work in the north every season, using as many machines. In that time they have carried prospectors on over 12,000 trips, transported 1,700,000 pounds of supplies, and flown a total of almost a million miles. These figures do not include the mail and passenger-carrying activities of commercial companies down the Mackenzie River, nor the trips with chartered 'planes made by several smaller companies.

The total fatalities for all that staggering activity amount to one—a pilot was drowned after his 'plane landed on a lake. Some machines were lost, but more were cracked up, repaired and flown out again. Not a pound of freight was lost and not a passenger was killed. Three prospectors who did come to grief were lost while they were on the ground and their 'planes were far away.

Like all the finest pilots in the world, it is difficult to draw stories from these men of the white North wastes. Adventures, to them, are the day's work, and they see nothing particularly romantic about their job. But one of the pilot-geologists of the Canadian North, E. A. Broadway, has told of a few adventures, and they are well worth the telling again. In the ordinary way these pilots obey the orders of their companies and avoid risks. "Safety first" is a slogan that is accepted as rigorously in the Canadian wilds as by the Imperial Airways pilots on the European routes. But there are occasions when the unforeseen happens, and then the pilot has to show of what stuff he is made.

In Canada ticklish landings on strange lakes and under adverse weather conditions sometimes have to be made. They are not meant for the novice. The Byrd Expedition to the Pole discovered that when the ground was covered with snow and the sky is overcast, so that the diffused light throws shadows, the horizon disappears from view; air, ground and snow all look the same, leaving the pilot almost no indication of where the ground is beneath him. The northern fliers know that condition only too well. They have learned to guard against its dangers by flying low in winter and never losing sight of the ground.

Three 'planes had to land in the mountains at the back of Herschel Island. At this point there were deep canyons, a high wind, hazy air, snow-covered ground, and no trees by which to judge altitude. After carefully scanning a canyon, one pilot landed safely and the others came down exactly in his ski-tracks. The men found that they had landed on a narrow shelf, and after unloading they simply took off by turning their 'planes and coasting down the mountain-side, like so many toboggans, hardly opening their engines. It took exceptionally nice judgment to do this safely.

Three machines had to pick up some men in a cave on a river. It was late spring, and they were still on skis. There was only a small patch of ice left, near the shore. They came down, picked up their men and took off again. A few hours later there was no solid ice left at all, and the men on the ground would have had to wait a whole month before 'planes with pontoons could have got to them.

Another pilot, working late in the season, was forced to land on weak ice, throw out his load, and have his passengers jump aboard without stopping the 'plane. The rotten ice was cracking and buckling beneath his skis, and a stop of only a moment would have meant disaster.

These pilots have a fanatical regard for their machines, despite the storms and dreadful conditions through which they force them. They will tell you in this Northland of Canada of one famous 'plane, the old *City of New York*. This machine became historic in the round-the-world trip of Collyer and Mears. Later she was brought out of the hangar to fly in search of a lost party of prospectors, known as the MacAlpine party. At the time all Canada was concerned about the safety of the eight missing men, and every available 'plane was pressed into service. At Baker Lake, because of the freeze-up, the *City of New York* had to change from pontoons to skis. There was no under-carriage available up there, so one was constructed out of a wireless mast.

Naturally no shock absorbers had come with the converted wireless mast, and it took exceptional skill to land the 'plane on rough drifts and keep it intact. Then the MacAlpine party wirelessly from Victoria Land that they were all safe. Four 'planes, the *City of New York* among them, flew north to bring out the missing men. But the inevitable happened. In a landing at Musk Ox Lake she broke several main members of her fuselage.

Two mechanics were left with her. They made emergency repairs with wire and a frying-pan handle. The 'plane took off all right, but at the next landing eighteen breaks occurred in the weakened fuselage. She remained there in the middle of the Barrens for months. Then mechanics and repair equipment were flown in.

The men built an igloo around her to facilitate work in the bitter winter weather. The fuselage was welded and the 'plane was safely flown to Fort Reliance. Now the *City of New York* is flying again over those same white wastes.

Unless they are knowledgeable men, these hardy explorers of the North are doomed when they make a forced landing. Duke Schiller, the man who became famous through his rescue of the *Bremen* fliers, missed his destination on one flight near Baker Lake, flew north to the Arctic coast, ran out of petrol, and started to walk back. He and his companion spent ten days in uninhabited and unexplored country. But they kept their heads, kept their proper direction, and conserved their supplies and vitality, until finally they were picked up by a search pilot, Pat Reid, who spotted the smoke of one of their signal smudges.

Brave men, these fliers of the North. Canada has every reason to be proud of them.

III

I have stood on an aerodrome at the Cape and watched an aeroplane loaded with a fortune in diamonds land easily on the ground. The machine had flown from that newly discovered Eldorado, the diamond fields of Namaqualand.

This field was controlled by the Union Government. Owing to the inaccessible nature of the wilderness surrounding Alexander Bay, military aeroplanes were called into use to transport the diamonds to Cape Town. Twice a week an aeroplane droned its way across the desert towards the military aerodrome at Cape Town. Once above the aerodrome, the machine circled steadily until the pilot glimpsed a little guard of armed soldiers waiting on the ground. Then the machine glided to earth. As soon as the engines were stilled, the pilot took a black box from the fuselage and handed it to the armed guard. In that box on each occasion were diamonds worth nearly £250,000.

The pilots were always heavily armed. Although this aerial traffic of diamonds had been kept a close secret, there was always the possibility of the fact leaking out. It might even

happen that an enterprising modern pirate would choose a fighting 'plane from which to trail the Jolly Roger. The pilots were ordered to change their flying route regularly and never discuss the nature of the cargo when off duty.

One day one of the aeroplanes had to descend owing to engine trouble. The pilot brought his machine down on a farm near the Cape. The farmer hurried out of his house to give assistance to the two airmen, but to his astonishment found a Service revolver levelled at him, and a harsh voice ordering him to return to the house. Later the engine trouble was righted and the diamond-freighted aeroplane resumed its flight to Cape Town.

During my flight over Africa I talked with one of these diamond-'plane pilots. He is now Captain R. F. Caspareuthus; of Imperial Airways, a very valuable pilot who for a time held the record for the flight from Croydon to the Cape. Before entering the service of Imperial Airways, Caspareuthus was a Union Air Force pilot whose job was to carry diamonds.

On one occasion at Port Nolloth, the only civilized spot in the near neighbourhood of these diamond-fields at Alexander Bay, a big, burly man loafed into a hangar where Caspareuthus was overhauling his 'plane.

"Carrying diamonds to Cape Town, aren't you?" queried the interloper.

Caspareuthus looked at him, but said nothing.

"Aw, that's all right," went on the stranger; "everybody knows about it. What I want to ask you is: d'you want to earn five thousand pounds?"

"Five thousand pounds!"

Caspareuthus was staggered. It meant ten years' salary to him. A great temptation to a young man with few prospects in the Union Air Force.

"Yes, five thousand pounds, paid on the nail, if you'll carry a parcel to Cape Town for me and ask no questions."

Caspareuthus turned his back on the man.

"Nothing doing!" he said shortly, and picked up a spanner.

The stranger was engaged in that most adventurous business of trafficking in diamonds, known in South Africa as I.D.B. He had a parcel of illicit stones, probably worth

£100,000, which he wanted to get safely out of the country. He knew that he would have to run the blockade of police patrols and the like if he tried to cross the desert and reach Cape Town. As long as those diamonds were in his possession he was in danger of being arrested. It would have been well worth £5000 to have tempted the young Air Force pilot to carry these stones to his confederates in Cape Town.

Caspareuthus had no cause to regret his resisting of that temptation. A few months later he was called in to a conference in Cape Town and heard that this notorious I.D.B. man had been arrested. It was soon proved that the aeroplanes carrying diamonds had been beyond the bribery of even the rich scoundrels trafficking in illicit stones.

Treasures in diamonds, as well as incalculable art treasures, were carried by aeroplanes across the deserts of the Middle East for the Persian Art Exhibition held a few years ago in London.

Four aeroplanes were commissioned. They carried the priceless crown jewels of the Shah of Persia, gold and silver carpets, and dazzling treasures and relics worth untold millions from the sacred mosques of Kum and Ispahan. The pilots had to carry these treasures on a perilous flight across wild mountains and trackless deserts to the island of Abadan in the Persian Gulf. There a British steamer took the treasures on board and brought them safely to England and an admiring public in London. It proved definitely that treasure, either gold, *objets d'art*, or diamonds, is safest when carried among the clouds.

IV

Radium !

The news was flashed across the white wastes of Northern Canada that the stuff, which is 50,000 times more precious than gold, had been discovered. At once aeroplanes were warmed up to journey into these unknown regions.

Radium is the white gold for which modern civilization is hungry. It is infinitely more precious than gold, for it relieves that dreaded disease of the world, cancer, helps to explode the atom, and peers into the inner heart of steel. And, like most

precious minerals, it is found only in the inaccessible parts of the world. In the heart of the Congo, in the frozen wastes of Russia, and now in the unmapped regions of Canada, radium has been found.

The aeroplane is making transport possible to discover the radium in these vast, barren wastes around the Great Bear Lake, 800 miles from the nearest railway. The story of the discovery of this new rich mining area of Canada is an adventure in itself.

It was Gilbert La Bine, a Canadian mining engineer, who decided to prospect this enigmatic waste of country. And he decided to explore it in the modern manner—by aeroplane. In the summer of 1929 he flew to Great Bear Lake in the Northwest Territories, with Leigh Brintell, chief of the Western Canada Airways.

Flying over the eastern shore of the lake, he observed in the region of Hunter Bay and Echo Bay that the ground was broken up by a great red slash of "gozzan", a rusty stain 100 feet wide, caused by iron ore. They landed and soon found a large vein of quartz. Along the shore at Hunter Bay on Great Bear Lake were lying immense boulders, some of them as much as sixty tons in weight. They were practically pure copper ore. La Bine staked some claims and with his companion turned south, wondering if, perhaps, the quartz contained some gold.

A few months later, when snow smothered the ground and the northern lakes were locked in ice, La Bine again flew by plane to this secret Eldorado. This time he took with him a mining companion of his silver-prospecting days, a man named E. C. St. Paul. They set out for the coast-line, hauling a sled loaded with 1500 pounds of supplies, and their feet shod with steel "creepers" to grip the ice.

Eventually, after six weeks' slow journeying through the wilds, they reached the rocky shores of Great Bear Lake, a sheet of water with an area nearly twice that of Lake Ontario. When the two explorers reached it, it was a lonely expanse, frozen white, a plain of ice dazzling and interminable.

The glare of the sun on the snow and ice, the endless hardship, soon had their effect upon the men trudging with their sled. St. Paul went snow-blind: La Bine pitched camp. From

the leaves of the tea that washed down their evening meal he made a poultice to cover the eyes of his companion. It meant that precious days must be wasted. La Bine determined to explore while St. Paul remained in the tent.

He set out across the ice and within an hour had reached a tiny island not far from a rocky point. He spotted something that seemed familiar. He had seen such rock before when prospecting for silver. He soon realized that he had discovered a rich find of silver.

Elated, he crossed the few yards of intervening ice to the shore to the rocky point opposite. Standing at the foot of this, he scrutinized its craggy face. He noticed a queer streak showing—a dark, greenish-black ribbon of deeply coloured lava, from two to nine inches wide, coursing irregularly from top to bottom and finally disappearing beneath the lake.

La Bine bent down to examine that queer stuff. A few minutes scrutiny sufficed. Then he stood up. The lonely man in that white wilderness, with a companion snow-blind in a tent some miles away, was dancing about and shouting like a madman. And he had reason to be mad with joy: he had discovered two veins of pitchblende, from which comes radium; he had made a silver find of considerable value; he had discovered a promontory from which thirty-two mineral specimens have been taken—specimens which may roughly be classified under the general headings of uranium, gold, silver, copper, and iron. It may well be that the Great Bear Lake discovery is the most important mining find of the century.

La Bine went back to his snow-blind companion and told him the good news. In a few days they were on trek again with the sled, making for the nearest outpost where they could register their claim to a rich slice of the earth's surface.

But their Eldorado was in one of the cruellest parts of the world. The few whites who struggle for existence in this Arctic region are faced with the possibilities of starvation, freezing, or madness through loneliness. Horrible things happen in these white outposts. The dogs that drag sleds through the snow are often as wild as the wolves. In fact, they are part wolf. On their journey back, La Bine and his companion heard of a child being eaten by the dogs, and of a colonel of the North-West



Photo by courtesy R.A.F.]

[Crown copyright reserved]

FLIGHT OF HART AIRCRAFT (ROLLS ROYCE ENGINES) OF NO. 2 (INDIAN)
WING FROM RISALPUR TO GULGIT, 1932

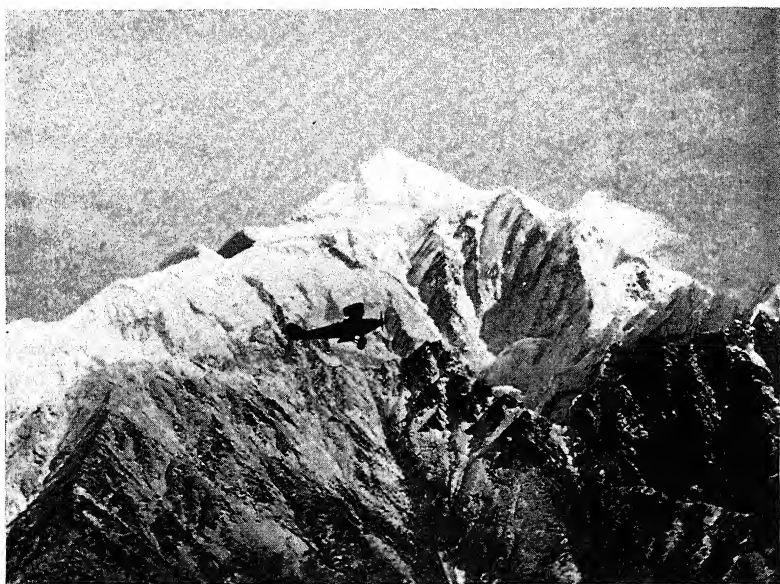


Photo by courtesy R.A.F.]

[Crown copyright reserved]

RAKAPOSHI MOUNTAIN (25,550 FEET), ONE OF THE BARRIERS SURMOUNTED
ON THE ABOVE FLIGHT

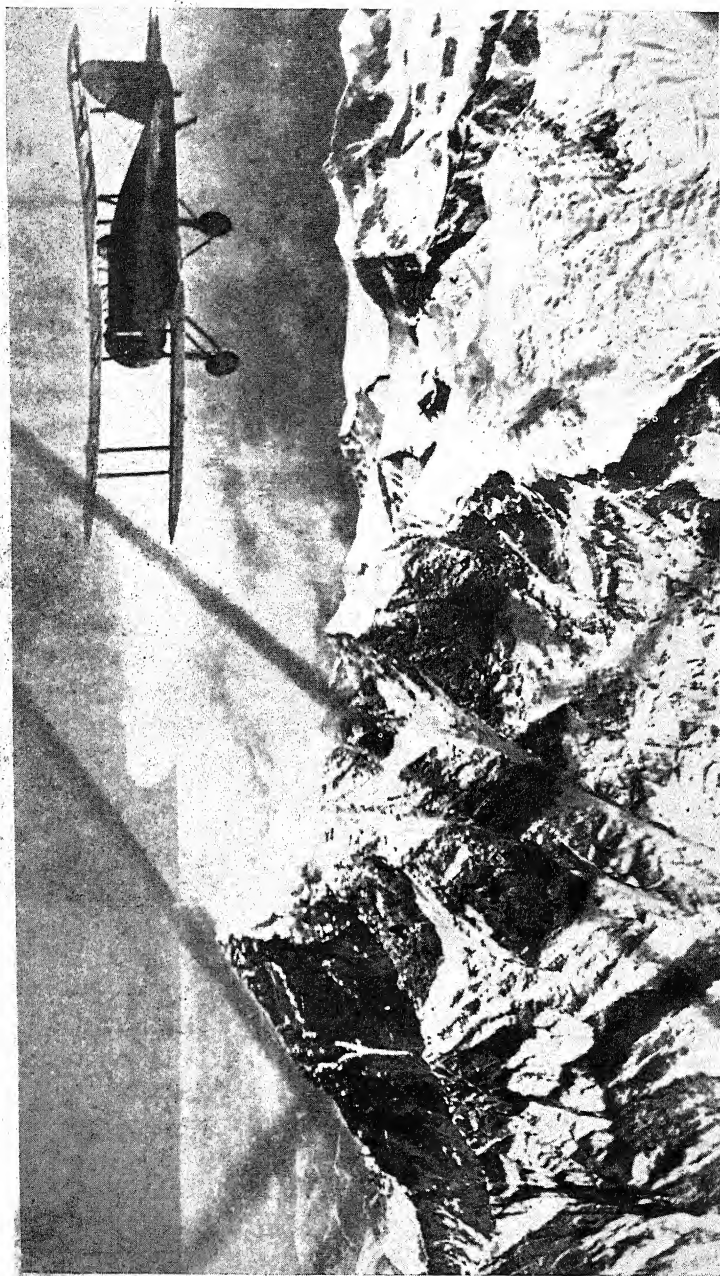


Photo by courtesy]

THE CONQUEST OF EVEREST

[*'The Times'*

Mounted Police who, returning from a duty tour, found that his wife had been torn to pieces by his dogs.

At another point they were met by a strange-looking man with white hair hanging down his back. He had been away on a trapping expedition but was unable to remember where he had been or what he had seen. How he had lived in the winter, when the temperature runs from fifty to seventy degrees below zero, was a mystery.

As soon as the rich radium discoveries of La Bine were made known, a mining rush began to Great Bear Lake. It was the consulting experts sent out by the Government and large mining companies that had already staked big claims who made mining history. They did much of their prospecting and searching by air, picking out deposits of pitchblende and silver ore from altitudes of 10,000 feet and more. The planes followed the light grey or green or black veins in the earth for miles.

Government aeroplanes and privately owned machines and air liners climbed and swooped and zoomed back and forth over this Arctic region in the strangest radium rush in history. In the first summer thirteen planes landed on Great Bear Lake, bearing eager hunters for mineral wealth to the number of about fifty. At the end of the season they came back to civilization with fabulous tales of silver and copper to be picked up in chunks. Twenty tons of pitchblende ore were brought out. From this amount about two and a half grams of radium was extracted—a small amount, but worth about £25,000.

Last summer over 1000 prospectors, many of them representing large mining interests, descended upon Great Bear Lake by plane. Most of the aeroplanes and pilots are in the service of Western Canada Airways, subsidiary of a larger air transport company. This company has established a series of stations on the lakes and rivers of the 1300-miles route between Edmonton and Great Bear Lake. This is important, because petrol on Echo Lake becomes a fluid worth more than wine or whisky. The problem of refuelling is the one that prevents too many private aeroplanes coming into the district.

As happened in New Guinea, on the goldfields, a town is being built by aeroplane. The town of Great Bear Lake is already in existence, and each aeroplane brings a new passenger.

and a load of material to help towards what may soon be a rich and flourishing city. Thousands of pounds of freight are at present being carried into the district by air daily by the dozen machines operating up and down the Mackenzie River Territory. During last winter the rush into Great Bear assumed large proportions, but when the summer came every aeroplane was pressed into service. And all the time mining engineers were clamouring for more machinery to be sent by air.

In the winter the aeroplanes were bringing back radium ore as cargoes. A radium refinery has been completed at Port Hope, near Toronto, Ontario, and has begun work. A new and secret extraction process has been perfected in the Government laboratories under the direction of Dr. Pochon, former assistant to Madame Curie in Paris. Dr. Pochon now directs the Port Hope refinery's activities. The distance between the Great Bear Lake and Port Hope is about 3500 miles. Only the aeroplane can hope successfully to conquer such distances.

What is the value of this new radium find? On examination of specimens in Government laboratories, the pitchblende was found to have radium present to the extent of 100 to 200 milligrams to the ton. This is equal to the Belgian ores that come from the great copper mines of Kantanga in the Congo. But these deposits in the Northern Territory of Canada are concentrated, and easily accessible to the surface, which is not true of the Congo.

The world needs an addition to its meagre store of radium. Actually there is less than one and a half pounds in existence all told. About half of this total, nine ounces to be exact, has been mined and purified within the borders of the United States. Not until 1922 did the Belgian radium appear on the market. When it did, it drove all other competitors out of the field. Belgian mines enjoyed a complete monopoly. It is not likely that the monopoly will continue if the Great Bear discoveries come up to expectation.

Once again in the rifling of the earth's treasure-house the aeroplane is playing a supremely important part.

V

There is nothing more terrifying in the big forests or bush than the outbreak of fire. Herds of big game have been known

to stampede for miles and in these blind rushes often find themselves hemmed in on all sides. In the wilds fire travels swiftly. I have experienced bush fires in Africa, and forest fires in Canada.

Now that the preservation of forests has become so important in the economic sense, the prevention of fires in the wilds has been the first consideration of forestry officers. The building of fire-belts and watch-towers, useful though they are, is not sufficient. The aeroplane, with its capacity for covering immense distances, and the bird's-eye view that it gives the pilot, has been pressed into service.

The usefulness of the aeroplane in this respect is best seen in Canada, and in Ontario in particular. The success of the aeroplane in forestry work in Canada has encouraged other Dominions to use this method. India and Rhodesia, both of which countries suffer tremendously from forest fires, are experimenting with aeroplane protection.

Ontario has an area of 110 million acres of forest land, and a forest crop valued at nearly 600 million dollars. When, in 1919, the Ontario Forestry Branch began a systematic forest survey, they used the old methods. Ground parties covered endless miles of forest country on foot.

This soon revealed itself as too slow and tedious. In 1921, therefore, with the co-operation of the Dominion Air Board, aircraft were used for the mapping of the forests.

The Air Board supplied and operated the aircraft, and the Forestry Branch supplied the observers or mappers, who were technically trained foresters. Three machines of the flying-boat type were used.

During the summer operating season 10,000 square miles were mapped from the air and a limited amount of aerial photography was carried out, some twenty-two hundred vertical and three hundred oblique exposures being made. For the first time, too, aircraft were used to assist the forest-protection organization of the province, the detection of fires being carried on in connection with the regular survey work. The total flying time for the season was 333 hours.

In the earlier years the use of aircraft was limited almost entirely to fire-detection and mapping. New developments and

new types of machines have, however, altered to a very considerable extent the use to which they are put. In 1932, 9728 individual flights were made with a total of 9735 hours. Of this, fire-detection accounted for 37.9 per cent., and fire-suppression and transportation for 53.4 per cent. Effective loads carried amounted to 115 tons.

The Forestry Branch is charged with the duty of protecting from fire the forest resources of the Province and for this purpose maintains an extensive ground organization. The air service is used to supplement the ground staff in the carrying out of this duty. In some areas of the Province aircraft are not used in any way. In other areas light Moth machines are used exclusively. They supplement the look-out towers in the detection of fires and are of particular benefit in connection with general supervisory travel.

In the more remote areas the light machines are depended upon almost entirely for fire-detection. It is in these remote areas, too, that the heavier freight-carrying machines show their worth. The distances are so great, and other means of travel so limited, that the bulk of the equipment, supplies, and men used to suppress fires is transported almost entirely by 'plane.

The location and type of the aircraft for forest-fire protection depend upon the distribution of the ground staff and the character of the country and are determined upon the recommendations of the District Foresters in charge of the various forest districts. Machines having been allotted to their bases, flights are carried out only upon the requisition of the District Forester. In districts where there is much settlement, the district office supplies an observer for each detection machine, otherwise the pilot acts as observer.

Fires detected are reported by dropping messages at a ranger's headquarters, by landing at a headquarters and reporting there, or upon the return of the machine to its base, where there is telephone communication with the district office. In some areas different headquarters are fitted with wireless, and fires reported at these points are in turn reported by wireless to the district office.

On a fine day a pilot has a clear view for more than fifty miles around. The moment he sees smoke issuing from the

forest depths beneath he flashes the exact locality by wireless to the nearest base, and aeroplanes and hose are then rushed to the spot before the fire has had time to secure a firm hold on the bone-dry timber. It is a lucky thing that many of the provinces where the fiercest conflagrations occur every summer—such as Manitoba and Saskatchewan—are also full of lakes, for where there is nothing but dense forest, it is naturally impossible for an aeroplane to land, and these expanses of water enable flying-boats to take off and alight in their battle with the flames.

Equipment has also progressed considerably since the days when fires were fought from horseback and canoe. One of the most important improvements has been the portable gasoline fire-pump. These pumps, which weigh a little over a hundred pounds apiece, can deliver effective water pressure three or four thousand feet, and, when used in relays, at a much greater distance.

The bulk of the flying is limited to the summer season, although five machines are outfitted for winter flying, four being used for general supervision and freighting, while the fifth is used in connection with the administration of Algonquin Park both winter and summer.

While forest-fire protection provides the main use for the aircraft, a great portion of the province has been mapped from the air either by sketching or photography. The total areas covered in this way now amount to 69,000 square miles. Aerial photographs, in addition to providing information for maps showing topographical features, have been used to determine timber types, to locate fire hazards, and to a lesser extent in connection with the location of roads.

VI

In a little room of a township on the edge of the wilds, the radio begins to jerk out its morse message.

. . . Request medical assistance at once by aeroplane for man suffering acute appendicitis . . .

decodes the operator.

The position is looked up on the map. Five hundred miles

distant. A trackless waste of snow, or bush, or jungle which in the ordinary way would take a week to cover.

But within half an hour of that desperate appeal by radio the engines of an aeroplane are warming up. A telephone call has brought a doctor. With his bag of instruments he steps into the machine. A wave of the hand, and the 'plane is climbing the sky.

Five hours later the doctor is bending over his patient. The diagnosis is confirmed. He stretches out his hand for the instruments. In this lonely outpost in the wilds he begins a delicate, tricky operation.

Such is the day-by-day work of the flying doctor. In our big cities, where a doctor seems to live just round the corner, it is impossible to appreciate the value or the magnificent work of the flying doctor. But in the back blocks of Australia or the silent white plains of Northern Canada a wounded or diseased man may easily die for lack of medical attention.

That is why, for those who watch as well as those who are in pain, the flying doctor and his aeroplane ambulance is one of the greatest gifts that our mechanical civilization has brought to the wilds. The cattle-ranger who has crushed a leg riding, the timber man hurt by a falling tree, the big-game hunter mauled by a beast, the gold-pro prospector wounded by dynamite—all are now given a chance of recovery by the boon of the flying doctor.

Few people realize the extent of this service to-day. Consider some of the experiences in the Arctic wastes of Canada. In an open two-seater 'plane, equipped with wheels and not the generally necessary skis, a pilot and mechanic set out one winter's day from Edmonton for Port Vermilion, 400 miles away in Northern Alberta. A message had come from this pioneer farming settlement that an epidemic of diphtheria had broken out among the Indians. Carrying anti-toxin serum, the 'plane battled extreme cold with its light engine for forty-eight hours and landed at Vermilion, where the thermometer showed 38 below zero.

The records of one flying company in Canada reveal that the appeals for the flying doctor and his ambulance are not limited to trappers and miners. Included in last year's work of

this company was an Indian with lockjaw, a woman with a fractured leg, a nineteen-year-old girl seriously ill with tuberculosis, an Indian with a poisoned hand, an Indian woman who was so sick she had to be carried to the 'plane on a stretcher, a woman who tried to poison herself in a mining camp, and a man who had gone blind after an injury. Altogether, the company made forty-five flights of mercy.

Gangrene poisoning is always one of the worst dangers of the wilds after injury. There was the occasion of a trapper who had been wounded in the jaw by the accidental discharge of a shotgun. This was 100 miles away in the bush, and his companions brought him to the small post of Keg River in Northern Alberta.

Gangrene had already set in, the man's lower jaw and part of his tongue having been shot away. A runner reached Peace River, the nearest settlement, in two days. A telegram to McMurray air base, several hundred miles distant, started a 'plane at once for Keg River, over the thick bush. It took the pilot just seventy minutes to bring the patient to Peace River.

Late one night an Indian pulled a toboggan into a northern Quebec mining camp. The load was a man whom the Indian had discovered unconscious in the snow, his feet, hands and face frozen. The thermometer, when the man arrived, was 50 below zero. There was no doctor at the camp, no medical aid for miles. But an aeroplane was expected the next morning, and the man was made comfortable. A blizzard came on during the night, but the aeroplane arrived to schedule the next day.

The sick man was placed in the cabin of the 'plane. The blizzard was still raging, and the pilot was doubtful whether he possessed enough petrol to reach the nearest township, 125 miles away. But he did not hesitate. Within half an hour he had taken the air with the sick man aboard.

It was a desperate flight. The blizzard was so thick that it was impossible to see ten yards in front of the 'plane. Below was snow and scrub, where a crash meant death either from injuries or exposure. All landmarks were obliterated. The pilot knew that he had to cross a range of mountains. He was flying blind, but managed to coax the machine, despite the weight of snow on the wings, an extra 2000 feet. With only a

few feet to spare, he crossed the mountains. Then, with but a gallon of petrol left, the 'plane landed at its destination. The patient was given immediate attention and put aboard a train bound for Québec.

It was also in the frozen north of Canada that an Indian was attacked by three bears. They mauled him so terribly that his life was despaired of. The only chance of saving him was a doctor, bandages, and the necessary cauterizing drugs.

By canoe, to a post where there was a telephone, an urgent appeal for aid was carried. The 'phone-message reached the base of one of the airways, and without losing any time a pilot of the Western Canada Airways took off with a doctor and a nurse. His route was 225 miles over trackless country. In two hours he had brought the help so badly needed. First aid was given to the stricken Indian, and then, still by air, he was carried to the nearest hospital. Here, under skilful treatment, he gradually recovered.

There appears to be no obstacle or difficulty which the flying ambulance will not brave and overcome. Up in northern British Columbia, far beyond the railway, among high mountains, a man was seriously injured at a gold-mining camp by a premature explosion of blasting powder.

It was hundreds of miles to the nearest town and medical attention. A runner would have arrived too late. A wireless transmitter was hastily devised and put in order by a wireless amateur who happened to be at the camp. He made contact with Telegraph Creek, 280 miles distant. There a 'plane was requested and left for the camp.

It was summer, but storms had been frequent, and it so happened that a storm broke after the pilot had left on his flight of mercy. He was forced down in that wild bush country, but managed to take-off again, and reached the camp in safety. There the injured man, his face and upper part of his body cut and burned, was put in the 'plane. The pilot headed for White Horse, Yukon territory, more than 300 miles distant. The flying ambulance encountered another storm, forcing the pilot to spend the night anchored on a small unknown lake till the weather cleared. At White Horse the patient was told he had a fighting chance to pull through.

The enormous distances and the isolation of desert outposts in Australia have made the flying doctor and his ambulance a real necessity in that continent. Many a digger, sheep farmer, or lonely prospector in the bush has cause to thank the flying doctor. Before he dropped from the sky, many people in outback Australia simply had to struggle with accident or illness unaided.

The Australian Aerial Medical Service was inaugurated in 1928 under the auspices of the Australian Inland Mission, a department of the Presbyterian Church in Australia. The Mission has, under the wise and self-sacrificing efforts and controlling influence of the Rev. John Flynn, devoted itself entirely to ministering to the physical, material and spiritual needs of the most sparsely populated portion of the vast hinterland of Australia—nearly two-thirds the total area of the continent.

The activities of the Aerial Medical Service of the Mission are centred at Cloncurry, in Queensland, and, as its name implies, its task consists of attending to the sick and injured in places which are otherwise out of reach of medical and hospital advice and assistance.

The headquarters at Cloncurry are equipped with wireless apparatus from which medical instructions and other messages are sent out on a short wavelength of 42 metres to a number of outback homes which have been provided with specially designed receiving and transmitting sets. The station is also supplied with an aeroplane and ground organization, and in necessitous cases the services of the flying doctor (Dr. Alan Vickers), with a pilot, are immediately requisitioned for journeys which in many instances exceed some 400 or 500 miles.

The record trip so far undertaken was one during last year, when a patient in a serious condition was conveyed from Normanton, in the Gulf of Carpentaria, to the Brisbane Hospital. The distance from Normanton to Brisbane is well over 1000 miles. The total mileage flown since the establishment of the Aerial Medical Service five years ago is about 100,000 miles, and this remarkable achievement has been accomplished without any mishap or accident.

The flying doctors are recruited from the best of Australia's

medical profession. The first one was a famous Sydney specialist who gave up a year of his life to come and work for a fraction of his usual earnings in order that the bush people might have the most skilled aid. Since then three other brilliant doctors have each taken their turn. In the first year of the service the flying doctor travelled 20,000 miles. He saw 225 patients and held 42 consultations.

Of course, the use of ambulance 'planes was discovered early in the war. They were able to bring wounded men from the firing line to the base hospitals quicker and with more ease and comfort than any other form of transport. The aeroplane can do in hours what would require days on rough roads, with painful jarrings and bumps from which even the swifter trains are not free. France used aeroplanes for her soldiers wounded in the campaign against the Riffs in Africa, while our own R.A.F. have used ambulance 'planes with marked success in Irak and also on the North-West Frontier of India.

During the severe fighting on the Wargla front in Morocco, a flight of small French monoplanes went to the actual front line and brought back wounded to a relay post twenty to thirty kilometres behind the battle line. From this point they were carried in larger Breguet 'planes to surgical hospitals more than 100 kilometres distant.

The ambulance 'plane has been a boon in Northern Sweden, which lies partly in the Arctic Circle. It is a land of lakes and streams in summer, and of ice and snow in the long winter. Travel over the rough roads, slow at the best in summer, is an ordeal in the winter when sleighs and skis are the only means of covering the white wilderness. But the country has an excellent telephone system, through which the Red Cross may be reached and the ambulance 'plane summoned. This large machine, which accommodates two beds and two sitting patients, is fitted with pontoons for landing in lakes in summer, and with skis for the snows of winter.

A difficulty which the pilot has to face in Northern Sweden is the short winter day, which lasts only four hours in December and January. Snowstorms and fogs are further perils. There is one case where an aviator landed on a frozen marsh, where a patient was to be brought to him.

A snowstorm had blocked all the roads, and the patient had not arrived. A dense fog spread over the landscape. Finally the patient arrived in a sleigh after a four-hours' journey to cover the five miles. Carefully the patient was lifted into the 'plane. The pilot took off, and flew above the fog which hid the land. Relying upon his compass, watch, and that indefinable air instinct of the born pilot, he arrived over the hospital, where signal flares brought him to a safe landing.

But to-day, in London, the Harley Street specialist often becomes a flying doctor. There have been many cases where Imperial Airways has carried doctors from London to France and even on to the Riviera to attend some wealthy patient requiring the presence of the best medical man available. Only the other week a Paris surgeon dashed over to London by air, performed an important operation, and returned to the French capital within eight and a half hours.

Scotland, too, recently saw its first air ambulance winging through the clouds. The case was that of John McDermid, a fisherman, aged 33, of Islay. He was suffering from perforation of the stomach. Peritonitis threatened. An operation was essential. Every hour of delay increased the danger.

The local medical man, Dr. Stewart of Islay, could not attend to the case alone. He wired for the air ambulance at 9.15. The message reached St. Andrew's Ambulance Association, Glasgow, twenty minutes later. A twin-engine Dragon Moth aeroplane, equipped as an ambulance, left Renfrew half an hour after the S.O.S. had been received.

Forty-five minutes later the aeroplane landed on the beach at Bridgend, Islay. Dr. Stewart had driven his patient eight miles by car, and Mr. McDermid was put in the 'plane, where a nurse was waiting. Forty minutes later the 'plane landed at Renfrew alongside an ambulance wagon, which left four minutes later for Western Infirmary, Glasgow, where the intricate operation was a complete success.

The flying doctor and the air ambulance have proved themselves. But it is not wise that this Red Cross service from the skies should be abused. Recently, when I was flying over the Sudan, I heard some of the strange requests received by the Royal Air Force centred at Khartoum. On one occasion an

urgent telegram was received from an outlying district asking for an aeroplane to convey a man suffering from toothache. As this flight would have necessitated extreme caution and even danger to the pilot, the request was refused and a homely method of dealing with toothache telegraphed back.

But in severe cases of malaria and other fevers, quick transport by aeroplane can help. Moreover, it is a medical fact that the transporting of such a patient from some low-lying fever-ridden spot into the rarefied skies of the tropics does a good deal to benefit the health. Fever patients visibly improve during air transport.

VII

"What will he get?"

I asked the question as the aerial stowaway, under police guard, left the room.

The old pioneer shrugged his shoulders.

"To tell you the truth, I haven't the faintest idea. You see, we've never had to sentence an aerial stowaway before. There doesn't seem to be any law on the subject. I was thinking of six months."

"That seems harsh," I ventured.

The pioneer shook his head.

"I don't think so. That boy endangered the lives of several passengers travelling in the aeroplane. The machine was already loaded to its full capacity. His hundred and forty pounds stowed in the fuselage might easily have prevented the machine from taking-off. Or the aeroplane might have stalled. Then the whole of the passengers would have crashed to their death. No, I think six months is a fairly light sentence for such a serious offence."

I have realized since, particularly as I was once an aerial passenger with a stowaway, that perhaps the old pioneer was right. It happened in the middle of Africa recently.

When the Imperial Airways machine *City of Bagdad* rose from the ground of the mining camp of Mbeya, in the heart of Tanganyika, the pilot, Captain R. F. Caspareuthus, felt the tail of the aeroplane sagging.

He half hesitated about returning. He was journeying

south to Broken Hill in Rhodesia, and carrying a full load of passengers together with the mails from London. Moreover, he was about to cross a wilderness of scrub and bush where there were no definite landmarks, no railways, and where a descent was as bad as dropping into an ocean.

However, Captain Caspareuthus decided to go on. He imagined that some baggage had been badly stowed away and was responsible for that sagging of the tail. Before sunset that evening he had reached his objective safely with his passengers. He saw his machine wheeled into the hangar, and sat down to dinner.

It was at that moment a tall, blond young man, speaking with a slight foreign accent, materialized before him.

"I want to see the German Consul," said the young man.

Caspereuthus laughed.

"I'm afraid you won't find a German Consul in a one-horse place like this. Where've you come from?"

"From Tanganyika," replied the young man.

"Flying?"

The young man nodded.

"I didn't see your machine in the hangar," persisted Caspareuthus.

The other grinned.

"No, I flew down in your machine," he said.

"Not as a passenger?"

"As a stowaway."

There was silence for a moment. Then Caspareuthus sighed.

"I think you'd better sit down and have some dinner."

"Thanks."

The young man tossed his double terai hat on one side and began eating with zest.

He revealed himself as an Austrian, Joseph Reder, aged 24. For some months he had been working on the Lupa goldfields in Tanganyika. Two other Germans were in his "outfit". In the long hours between washing the ground for traces of gold, young Joseph Reder busied himself with an invention which he believed would revolutionize aviation. He had actually completed his plans, and with enthusiasm he showed them to the other two gold-diggers.

They struck a bargain. They persuaded Joseph Reder to let

them go to Berlin with the plans of the new invention in their suit-cases. Reder was to stay on their claim until they cabled him. The Austrian youth agreed, and the two Germans set off for the coast.

No sooner had they gone than doubts assailed Reder. Could he trust his companions? Would they market the invention as their own and reap the benefit? Night after night he worried himself with such doubts in the loneliness of the bush, and at last packed up and trekked to the nearest outpost—Mbeya.

From here he sent several desperate messages to his parents in Austria asking for money to pay his passage home. He hung about the wireless station day after day, hoping. Nothing arrived. At last one night, in desperation, he entered the aerodrome where the Imperial Airways machine *City of Bagdad* was resting for the night. At six o'clock in the morning he was in the air and being thrown about by the hot-air currents.

After his dinner at Broken Hill, Joseph Reder was kept under lock and key. Flying from Broken Hill back to Mbeya, I found the stowaway my fellow passenger. Once again Caspareuthus was the pilot.

We were all the best of friends. We even discussed the possible sentence that Reder would receive. As it was a unique case, there seemed to be no law on the subject except from one old pioneer who pessimistically suggested two years' imprisonment.

On arrival at Mbeya, a khaki-clad officer of the police rattled on to the aerodrome in his car. The prisoner was handed over. As soon as the identification preliminaries were completed, the officer took his prisoner towards a stone doorway. He was ushered through. After the brilliant sunshine, Reder blinked in the gloom. He found himself in the bar of the one hotel for three hundred miles.

Half an hour later officer and prisoner were on their way to the gaol.

"A great pity," said the barman, shaking his grey head. "D'you know that a sum of money was wirelessed here for the boy three hours after he had left in the aeroplane? . . ."

That was the first aerial stowaway in Africa. First offenders are likely to be regarded in an untrue, romantic light. It was so with the first aerial stowaway over the Atlantic.

A flip of a coin sent Arthur Schreiber into the adventure that carried him across the Atlantic as a stowaway in the *Yellow Bird*. It may be recalled that the *Yellow Bird*, flown by three French aviators from New York, was forced down in Spain and obliged to make another hop to its destination, Paris. It was said that the presence of the stowaway so upset the balance of the 'plane that it became necessary for the fliers to dump overboard a certain amount of petrol during one of the storms encountered over the Atlantic. This prevented the aviators accomplishing the flight of their desire—New York to Paris.

The French aviators were extremely generous in their treatment of this stowaway despite the severe disappointment for which his presence was responsible. Schreiber was written up in the Spanish papers as *Chico Yankee* (the clever little American), applauded wherever he went, and shared in the entertainment accorded to the aviators.

The list of air stowaways is a small one at present. I have tried to discover the first of these young adventurers. So far the honour appears to be possessed by Herbert State, a 13-year-old Kansas City boy, who hid himself in the fuselage of an aeroplane owned by a business man. The small party of passengers set off to keep an appointment with the then President Coolidge, but were soon compelled to make a forced descent owing to the extra weight of the stowaway causing the machine to behave queerly.

The *Graf Zeppelin* seems to have a fascination for the aerial stowaway. Two American youths made trips in her by hiding themselves, and subsequently they were spoilt by the limelight of publicity they received.

There was Clarence Terhune, the St. Louis boy who stowed away on the *Graf Zeppelin* on its flight from the United States to Germany in 1931. He not only avoided imprisonment, but returned to the United States a hero, to be met by hordes of reporters and publicity men.

But Herr Eckener and his crew soon determined to stop these adventurous stowaways of the air. They realized only too vividly the danger to other lives. When the *Graf Zeppelin* started from Lakehurst for its round-the-world trip, a New

Jersey lad attempted to hide on the big airship. He was discovered and put under guard by the United States marines. Dozens of sailors, carrying flashlights, climbed all over the dirigible, looking in every nook and crevice for other stowaways who might be hidden and waiting the moment when the airship was over the Atlantic before revealing themselves.

Only one other youth succeeded in stowing himself away on the *Graf Zeppelin*. He was Albert Buschko, a German. Albert was dealt with severely. He learned to his sorrow that there were to be no shouts of the admiring populace for him. Imprisoned in the control-room of the *Graf Zeppelin*, the baker's apprentice who had made his way from Dusseldorf to Friedrichshaven, secreted himself in the mammoth hangar and slid down a rope into the ventilator of the dirigible, had plenty of time to realize the seriousness of his escapade. His dream of adventure and world-fame vanished.

"It's not as I thought," he complained bitterly. "American boys were cheered and entertained: I am made a prisoner."

But he had an indignant Dr. Eckener to deal with.

"When the boy leaped from the roof of the hangar to the top of the ship he stood an excellent chance of plunging through the fragile material of the dirigible, endangering all sixty lives aboard," said the great airship designer. "The stowaway will be deported. When he returns to Germany, in place of lionizing, he will receive proper and adequate punishment."

Which is exactly what happened. Aerial stowaways are not applauded nowadays. Moreover, to board an air liner unperceived is almost impossible. I doubt very much whether it could happen with an Imperial Airways liner at Croydon or a Luft Hansa machine at Tempelhof, Berlin.

But there are still plenty of venturesome boys about eyeing these air liners wistfully.

CHAPTER VIII

THE R.A.F.

I

It is impossible in any book devoted to the conquest of the air to ignore the immense and valuable pioneer work performed by the Royal Air Force. Their work in pioneering new routes, in policing the far-flung frontiers of the Empire, in testing all new makes of machines and engines, in mapping, in the collection of weather reports and the recording of flying conditions all over the world, has been of tremendous service to aviation generally.

There are alarmists who picture the horrors of a great war in the air. They terrorize civilians by reports of cities laid waste by bombs from the air, of gases drenching streets and countryside, and of high explosives devastating from the clouds above. This very-much-overdrawn picture is often used as an argument for the retrenchment of our flying services, whereas it could more logically be used to support their expansion to protect us from these horrors. Moreover, it is at least doubtful whether a short and sharp air war in which munition factories are destroyed and certain civilians incidentally killed would not be preferable to the long-drawn-out horror of the last war, when the pride of our manhood was slaughtered in relays and our wealth was dissipated, while the will to war of the civil population remained comparatively strong. In any case, if those same alarmists would realize how much the Royal Air Force has contributed to the peaceful air penetration of the world they might be among the first to emphasize the necessity for extension and further development of this splendidly organized force.

The remarkable efficiency of the Royal Air Force, unsurpassed to-day in the whole world, is largely due to its unified direction, its personnel, its very effective training, and lastly

but not least, to the careful selection of the craft employed. All its machines are British, and the impetus it has given to British aeroplane manufacturers is incalculable. It is certainly safe to say that but for the R.A.F. and its experimentation policy, as well as its work throughout the Empire, there would be few British air lines in existence to-day.

It would be impossible, except in a very large tome, to compress the whole of the adventurous work of the R.A.F. even for one year. When Sir Philip Sassoon, Under-Secretary for Air, recently introduced the Air Estimates in the House of Commons, he revealed that an R.A.F. man not only sees the world, but also he sees life—the sort of life that is written about in romantic novels and seems too remote and fantastic to be true.

He detailed some of the strange tasks that fall to the lot of British airmen. Royal Air Force aeroplanes rescued a motor-car party lost in the sandy wastes of the Libyan desert and took water to an African trade expedition stranded north of Wadi Halfa with only one small bottle of water left. He told, too, of R.A.F. pilots rushing an appendicitis case 500 miles across the desert to Khartoum, taking a Sultan's brother to hospital for eye-treatment, and helping a District Commissioner in some out-of-the-way spot to collect taxes from semi-nomadic tribes.

M.P.s were thrilled by his description of how the map of the world is being covered by a network of thin red lines, the vast air routes where the pioneer flights of the Royal Air Force are blazing the trail for civil air transport. Although we are only fifth in the list of air forces of the world, we have the satisfaction of knowing that no other force is better equipped or has a higher standard of training or efficiency.

Perhaps the frontier activities of the R.A.F. are seen at their best and most exciting over the most famous frontier in the world—the North-West of India and Afghanistan. Towards the end of 1932 a magnificent flight over the Himalayas was undertaken by R.A.F. machines and some splendid photographs of hitherto inaccessible country were taken. Very little was said about this achievement at the time, but the photographs speak for themselves.

The flight was undertaken by five Service machines,

standard "Harts" with Rolls-Royce Kestrel engines, of No. 39 Bomber Squadron, Risalpur. During this exceptionally fine flight, Mount Rakaposhi, 25,550 feet high, was flown over, and it is interesting to note that Mount Everest is only 3400 feet higher. For a formation of five machines of Service type to fly at such a height for several hours, and over country of such a rugged nature, is no mean achievement. No. 39 Squadron might well add to their motto of "By day and by night" the words "Over all mountains and plains".

When one has flown over the mighty Khyber and further on, the Kohat Pass, the daily work of the R.A.F. bomber planes is a thing to marvel at. Sun-baked, jagged mountains seem to be crumbling into dust beneath the wings. The blazing sun, the fierce winds, the queer eddies and the thousand and one air-pockets, not to mention the watchful, sharpshooting Pathan, make each of these flights an affair of incredible adventure. The effect of aeroplanes upon the warlike tribes of the Indian frontier has been immense. When, just before the close of the third Afghan war, a British aeroplane delivered a bombing attack upon Kabul, a new era was opened in the defence of India.

To see the remarkable efficiency of the R.A.F. frontier aerodromes at a place such as Peshawar is to realize how the modern machine has brought peace to an area hitherto in a state of incessant tribal warfare. When the pilots of the bombers leave upon an expedition, they carry before them an aerial photograph of the country with the specified targets clearly marked on them. These photographs are about eight inches square, are very clear, and the target is marked with a circle. The tribes have previously been warned to evacuate their villages, for it is not desired, or indeed necessary, to cause casualties except among lashkars in the field. All that is required is to render the life of the rebellious community too uncomfortable to make the struggle worth while. Moreover, they are offered no prospects of exciting land fighting and loot. The bombing machines carry 230-lb. and 20-lb. bombs, and the fuses are arranged according to the nature of the target so that they penetrate before bursting. The twenty-pound bombs are used partly as "sighters".

Raids are carried out by squadrons in a series of flights. These flights, which consist of three 'planes each, leave the base at half-hour intervals, so that not only is the bombing continuous, but the enemy cannot tell from which direction to expect the bombing, nor the particular 'planes which are going to bomb next. During one day the R.A.F. from Kohat carried out more than two complete squadron raids, and the 'planes from Risalpur completed three squadron raids, obtaining many direct hits.

The aeroplanes carrying out these raids bombed their targets from a height of 3000 feet, and the very good results obtained have once again proved the value of this arm of the Service. Their employment has many a time averted a serious situation which in former days would have necessitated the use of large bodies of troops and the consequent loss of life and expenditure of considerable sums of money.

And what is the real effect of this bombing? It is best summed up by Sir Philip Sassoon in his tremendously informative book *The Third Route*, which describes an aerial tour of inspection that he made throughout Egypt and the Sudan and India before civil air liners were traversing those countries. He first points out the expense in lives and money of the old methods of dealing with tribal raiders.

"Punitive expeditions across the frontier, such as have been so frequent during the past half-century and more on the frontiers of India," he writes, "would stir up all sorts of political trouble, the consequences of which it would be difficult to foresee. Moreover, if Indian experience is any guide, such expeditions, unless followed by permanent occupation, are usually barren of results, other than the deepening of old or the creation of fresh animosities. The despatch of a column of all arms into a little-known and hostile country is always a costly business, both in men and money. Though the enemy's villages be burned and his stock, it may be, destroyed or driven off, it is usually a matter of great difficulty to bring the actual offenders to book. The expedition withdraws, losing many men to snipers on the way, and the enemy returns to his burnt-out homesteads filled with a consuming desire to get his own back.

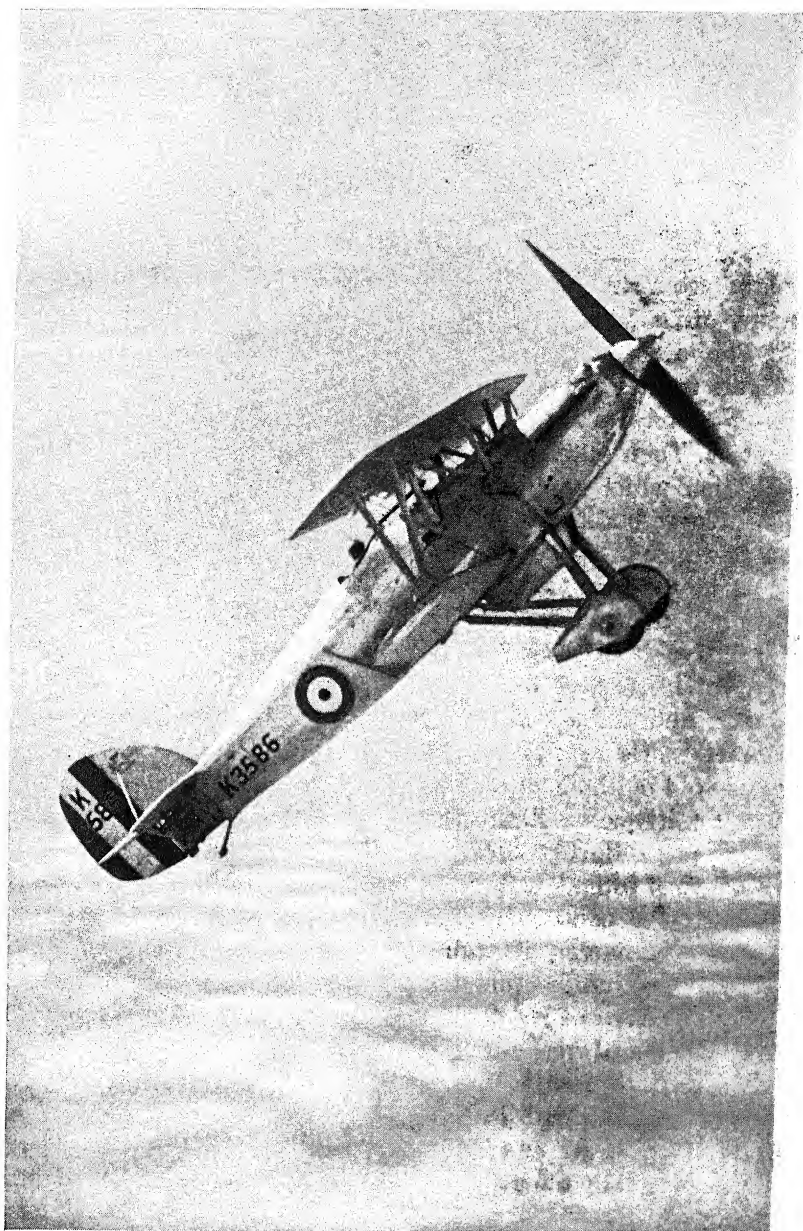


Photo by courtesy]

[“Flight”

HAWKER SUPER FURY (ROLLS ROYCE ENGINE)

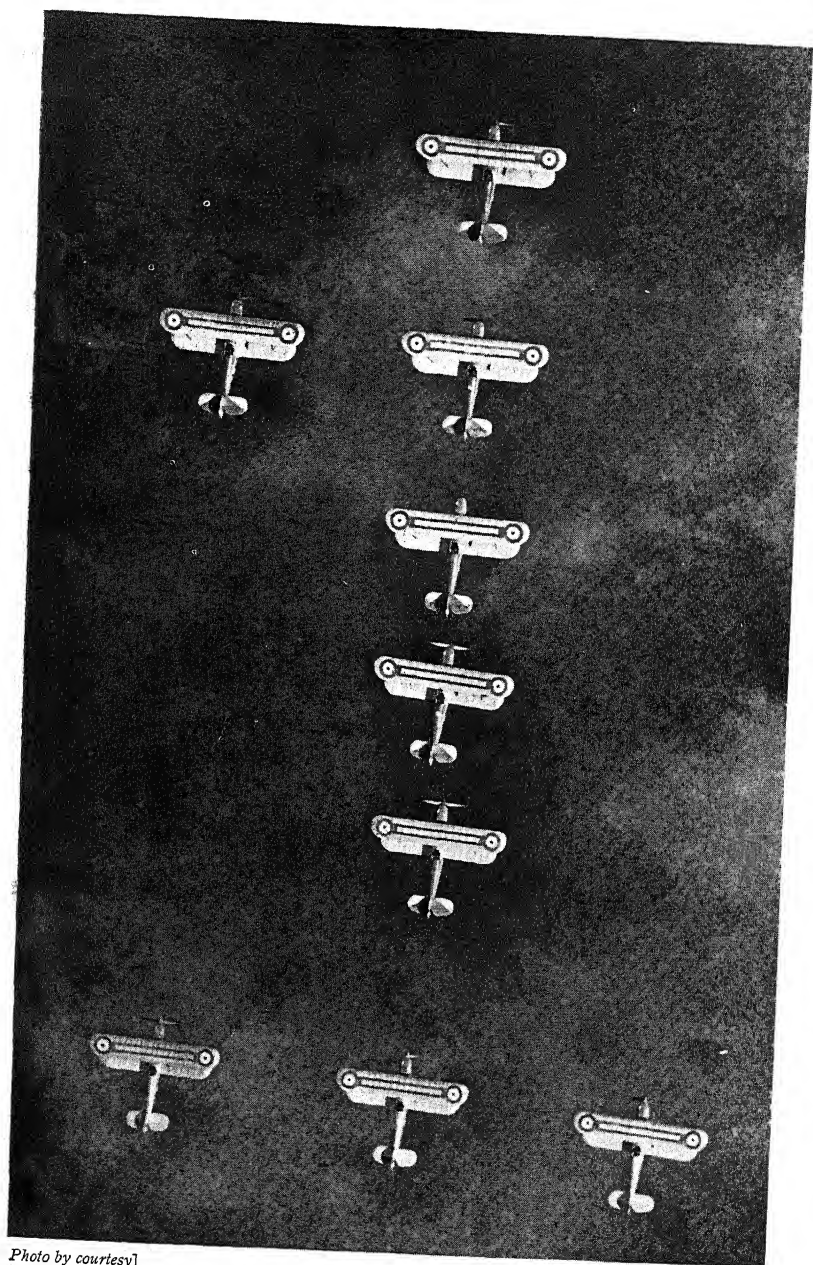


Photo by courtesy]

NO. 1 SQUADRON (FURIES) MAKE THEIR OWN
NUMERAL IN FORMATION

[“Flight”

"The method and effect of air action are quite different. At the first rumour that tribesmen are collecting in some convenient centre behind the frontier, the nearest air forces are on the alert. Friendly herdsmen searching for grazing for their flocks on the desert outskirts bring swift warning that a raiding party is on the move. Within an hour machines are in the air, and if the raiders are not met and stopped before reaching their objective the odds are that they are caught and dispersed while still striving to take their booty back into their country. Probably but few casualties are inflicted on them; yet they return to their homes with the knowledge that their raid has been a failure, and that there is nothing that they can do which will secure that other raids will not be equal failures. Gradually the lesson sinks in. Though they may not have lost many men, the few men lost have died to no purpose. They are filled, not with a spirit of anger and revenge, but with a conviction of impotence. . . .

"It must not be thought that the risks attending the use of air power for control of the frontier tribes are all on the one side. The warning notices which are dropped prior to the bombing let the tribesmen know beforehand what to expect, supposing that their consciences have not already put them on the alert. They are well prepared, therefore, to open fire on our machines. Many of them nowadays possess modern rifles, and the standard of their marksmanship has so much improved that the chance of a machine being hit is by no means inconsiderable. If a machine is hit in some vital spot, or if anything goes wrong with the engine, the pilot can count himself fortunate if he makes a safe landing and gets away afterwards. Casualties among the R.A.F. personnel engaged in air operations on the frontier would inevitably be very much heavier than they actually are were it not for the extremely high standard of maintenance both of machines and engines.

"Though punitive expeditions carried out by the Air Force do not last as long as did the old ground expeditions, they may yet take some considerable time before a really obstinate tribe is brought to acknowledge defeat. In such cases a very large amount of flying has to be done over extraordinarily wild and difficult country, with a corresponding risk of forced

landings. Among the great mountains are many caves which have been known to, and from time to time used by, the native population since the memory of man. When their villages are bombed the tribes retreat with their goods and chattels to these caves, where there is safe shelter for man and beast. All that the aeroplanes can then do is harass the tribesmen and their flocks and herds when they come out. The work is arduous and unremittent, and the contest resolves itself into a question whether the airmen or the tribesmen can hold out the longer. The tribesmen waste a good deal of ammunition by shooting at the machines. The aeroplanes drop a certain number of bombs, which impress the tribesmen with the necessity of keeping under cover; but very few casualties are incurred on either side. Obviously such a state of things may on occasions continue for quite a long time. Indeed, it has been suggested that in many cases the deadlock would probably have gone on very much longer than in fact it did, had it not been that the caves were so full of fleas that ultimately even the case-hardened villagers came to consider surrender the lesser evil of the two."

I have quoted at some length, because I consider this the most reasonable and sound explanation of the activities of the R.A.F. on the North-West Frontier which has yet appeared. It may help to dispel much of that outrageous criticism to which the Service is constantly subjected. Sir Philip Sassoon has also given us glimpses of the actual police work by air in operation.

There were the two campaigns of 1925 and 1927 on the Indian Frontier, when the Mahsuds in the one case and the Mohmands in the other were dealt with effectively by the R.A.F. In the case of the Mahsuds this warlike tribe had held out against land forces for some four years. Once they were attacked by aeroplanes, the end of the campaign began to be in sight. Actually, after a few weeks the tribesmen surrendered. It was not because of the casualties inflicted by the bombers. These were, indeed, trifling. But the moral effect was infinitely great. So it was with the Mohmands. They felt secure in their mountain fastnesses. But, like eagles among the hills, the R.A.F. 'planes discovered them. After a few bombing attacks the lashkars dispersed and the tribesmen returned to their own villages.

THE R. A. F.

II

The same effective work has been done on the wide plains of Iraq. Late in 1927 a desert police post was attacked, the personnel brutally slaughtered, and the Iraqi grazing tribes raided and robbed of their cattle. The R.A.F. patrols, though too late to save the police, caught one of the raiding parties while its members were actually distributing their spoil, and inflicted a very sharp lesson on them. The raiders, Wahabi Arabs, quietened down after several such attacks had spoiled their national sport.

R.A.F. 'planes, together with armoured-car companies, are employed to control Palestine and Transjordan.

In the wild wastes of the Sudan, R.A.F. 'planes have been particularly useful. Mention has been made of their co-operation with that romantic African corps, the King's African Rifles. 'Planes, in combination with the K.A.R., are helping to stamp out the slave-raiding which takes place on the borders of the Sudan and Abyssinia.

Not very long ago an R.A.F. aeroplane with two British airmen and a native soldier on board, acting in co-operation with the Eastern Arab Corps, crashed at Cedaref, in the Kassala province of the Sudan. The three occupants were killed. This crash on the Abyssinian border, 250 miles south-east of Khartoum, directed attention to the repeated raids by Abyssinian tribesmen across the borders, both into the Sudan, and into Kenya, where they have stolen cattle and murdered, robbed and carried off villagers into slavery. It was stated in Parliament that in two months about 120 natives had been killed in Kenya by Abyssinian raiders, despite the Emperor of Abyssinia's repeated orders for the strongest action to be taken against slave-raiders. It indicates that Africa's oldest traffic still exists, and only aeroplanes with their swift mobility can hope to check the raiders. Unfortunately aircraft for this purpose are not available in Kenya.

Aeroplanes have also been engaged in fighting the Nuers of the Sudan, one of the most warlike tribes in the world. The Nuers are a very primitive race, always on the move, and distinctly nomadic in their habits. They have developed a

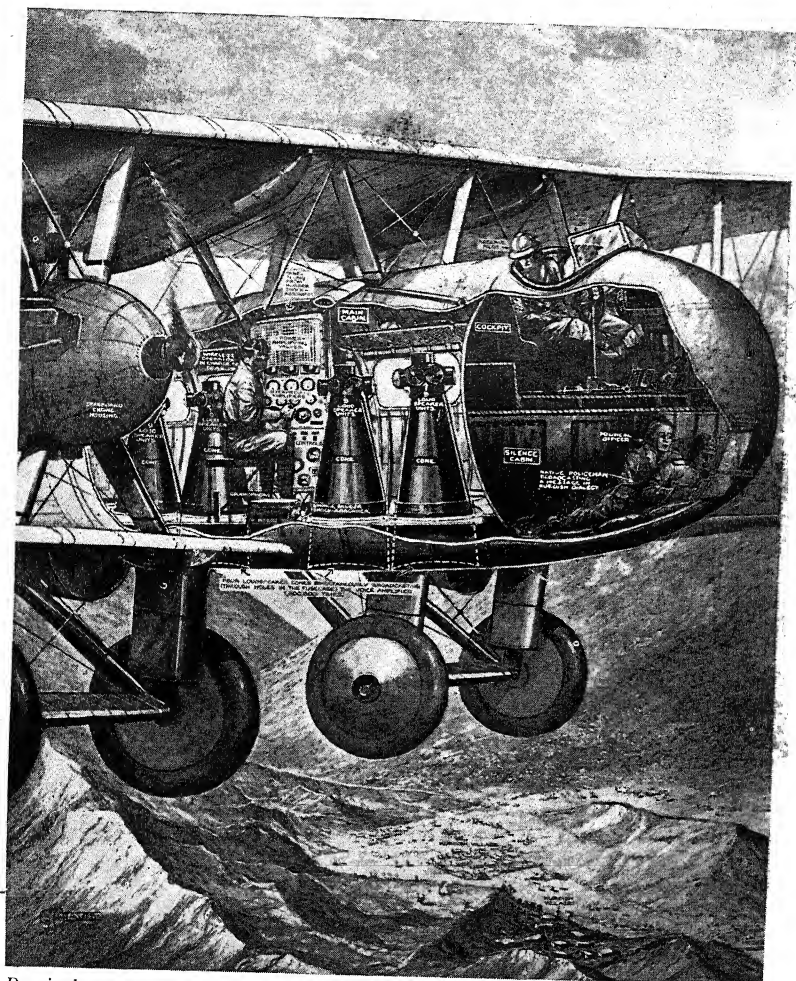
BY AIR

resemblance to storks or cranes, from the nature of the country, the swamps, they inhabit. Always they seem to be standing on one leg, and with their thin bony bodies they grow to an immense height. They are, in fact, among the tallest natives in Africa. Moreover, they wear the least possible amount of clothing. Always they carry a spear or a club. Always they are in warfare against intruders into their country.

As Sir Philip Sassoon has pointed out, these Nuer know their own country backwards and forwards and are exceedingly mobile. When they have got into trouble, which is often, they drive their cattle away to some hidden island in the marshes, store their few other belongings and womenfolk there, and take to the field. The result is that they are extremely difficult to track, and even when they have been rounded up in some swamp fastness it is often impossible for infantry to get them by open attack. A long siege has to be undertaken, during which many of the besieging forces inevitably fall sick.

The particular sections of the Nuer tribe against which the air forces of the Sudan were engaged some three years ago were those inhabiting the Lau and Lake Jorr areas, in the extreme south of the Sudan, close to the Uganda frontier. The one case centred round a witch-doctor named Gwek Wonding, who owned a mud pyramid sixty feet high. This had been built by his grandfather, a noted witch-doctor, who had caused himself to be buried there. It was adorned at the top by a long iron rod which was regarded with especial reverence. The prestige which had accrued to Gwek from this unique inheritance had brought him many adherents, and he had begun to give serious trouble, besides threatening to murder the District Commissioner. It was decided that, in the interests of the peaceful inhabitants of the district he was harrying, his band should be dispersed and his pyramid abolished.

The force detailed to deal with Gwek comprised sixty rifles and two machine-guns of No. 7 Infantry Company, Equatorial Corps, forty police, and a flight of No. 47 Squadron—a small enough force, even with supports behind them, to deal with 4000 fighting men, possibly half of them armed with rifles. Operations started with the bombing of Gwek's village and hostile concentrations and herds in the vicinity. Further action



Drawing by courtesy]

[Illustrated London News

AIR WARFARE BY LOUD SPEAKER
COWING REBELS BY VERBAL "BOMBS"

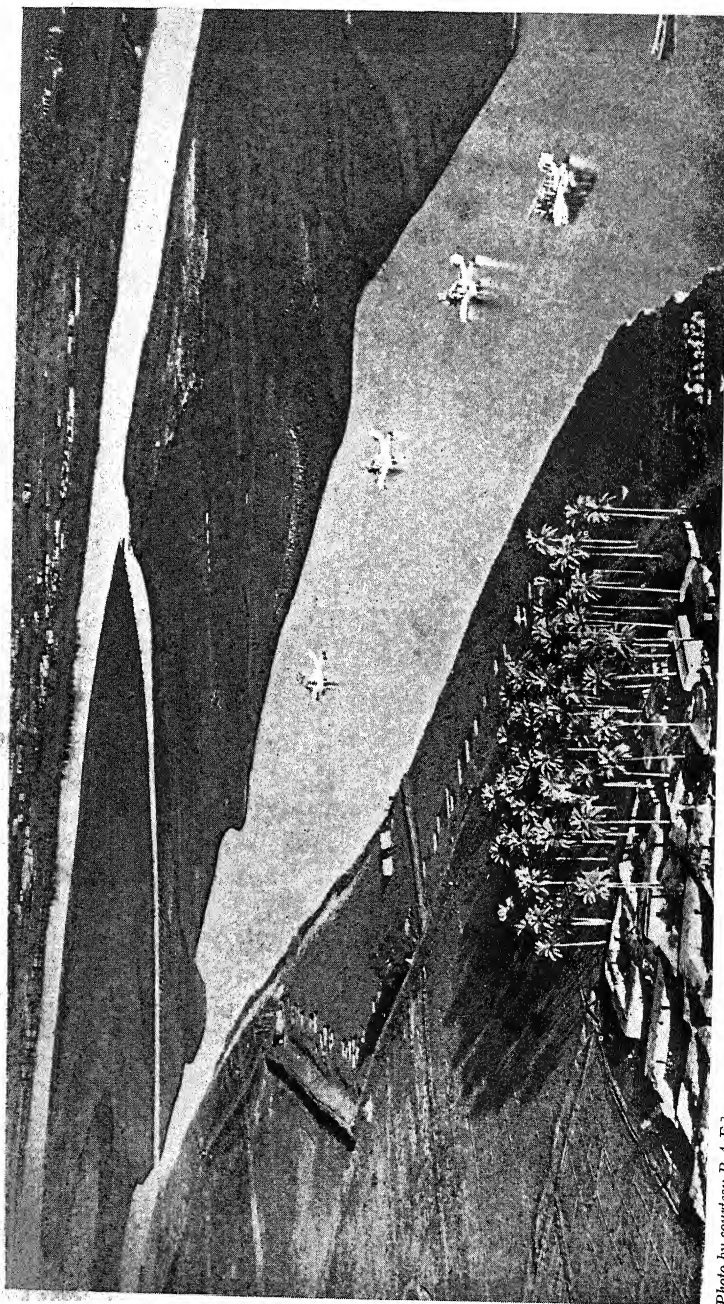


Photo by courtesy R.A.F.]

SUPERMARINE SOUTHAMPTON (NAPIER) FLYING BOATS ON THE RIVER TIGRIS
DURING THE FAR EAST FLIGHT 1927-28

[Crown copyright reserved]

THE R. A. F.

was then suspended to enable the Political Officer to investigate and ascertain the results of the bombing. He reported that the material damage had been small, but that the moral effect was very good. The Nuer concentrations had been broken up and scattered over a large area.

A company of mounted rifles, a camel company, and the remainder of No. 7 Company had now joined the expedition. After air reconnaissance, an advance was made on Gwek's village, which was found to have been hastily evacuated. The village was burned, and the pyramid robbed of its adornments. Gwek and his followers had retired to a different district. This meant more long marches, but meanwhile the Air Force again took action, and a few days later Gwek's chief supporter surrendered with a body of 100 fighting men. Organized resistance had already ceased, and the operations now resolved themselves into an endeavour to round up Gwek himself.

This proved no easy task. At first he did his best to stir up trouble in other districts, but as the pursuit continued his friends fell away from him till he was left with a small party of personal adherents. Patrols were sent out in all likely directions, until it was definitely ascertained that Gwek was a fugitive with no following and had left the Lau area for an unknown destination. The patrol was then ended by the solemn blowing-up of Gwek's pyramid in the presence of the assembled chiefs of the district, who were profoundly impressed by the sudden disappearance of an object which they had been taught to venerate as possessing magic powers. It was only after further operations that the redoubtable Gwek was finally accounted for.

The second expedition arose out of the murder of the District Commissioner, Captain V. H. Fergusson, with a Greek merchant and friendly natives, at Lake Jorr, near Shambe. A small force of similar composition was sent at once to Shambe to round up Chief Garluark, who was responsible for the murders, and to inflict punishment on the Nuers immediately concerned. An advance was made in three columns converging on Lake Jorr, and before it had gone far Garluark gave himself up. There remained the punishment of the actual murderers.

The advance continued, meeting with some small resistance at one or two points. Much of the line of march was through continuous swamps, and progress was most difficult. The effect, however, was to drive the enemy into an area of swamps and small islands bordering the Bahr el Ghazel River, where it was quite impossible for the troops to follow them without sinking up to their necks in water. Accordingly all known exits from the area were blocked by the troops, and, as an alternative to a prolonged siege, which would have entailed much suffering and loss of life to besiegers and besieged alike, the Royal Air Force were called in to bring the operations to a quick and decisive end. The enemy were located by aircraft and subjected to systematic air action, with the result that in the course of a few days they surrendered.

The desert route from Palestine to Bagdad, now covered by Imperial Airways machines, as well as the French Union air line, from Syria, was only made possible by extensive pioneer work by R.A.F. fliers. The military operations of the R.A.F. in Iraq have been undertaken concurrently with the collection of an immense amount of information and photographs and weather reports regarding flying conditions over the vast desert.

But occasionally even the big air liners have suffered from the sudden sandstorms that spring up in these areas. Then the R.A.F. have become rescuers, and many a serious calamity prevented. There was one occasion when a French air liner, flying from Damascus to Bagdad, met with disaster. The three occupants—the Swiss president of the League of Nations Commission on the delimitation of the Iraq-Syrian frontier, the French pilot, and his mechanic—were all killed.

The machine encountered one of the terrific sandstorms which are the bane of airmen in the Middle East, and crashed into a sandy mound. As the machine was not fitted with wireless, it had been impossible to warn the pilot of the approach of the storm. When the air liner failed to arrive, R.A.F. planes immediately set out to search the desert. Eventually they discovered the wrecked machine and brought the bodies of the unfortunate victims to Bagdad in one of the planes.

That brilliant young explorer, Mr. Bertram Thomas, who was the first white man to cross the great empty quarter of Arabia, the Rub'al Khali, has described vividly how aeroplanes helped him to evacuate a town in Iraq when he was surrounded by rebellion. He was the military representative at Shatrah, and, hemmed in by hostile tribes, was forced to watch the successful spread of *Jihad*, or holy revolt.

The town was obviously too hot to hold Bertram Thomas and his assistant much longer. So Thomas decided upon evacuation if that were possible. S O S messages were secretly sent by runner to Nasiriyah to ask Bagdad for 'planes. But rescue by aeroplane presented many difficulties.

Firstly, the landing-ground at Shatrah lay some half a mile away on the other side of the river, beyond the town walls. To walk there meant passing through a crowd in which some fanatic was sure to be waiting. Secondly, if an aeroplane was shot down by some tribesman, the consequent air reprisals would not be good for the health of Bertram Thomas and his assistant.

So Thomas sent for one loyal sheik and told him confidentially of his plans. At the same time he thanked the sheik for his unswerving loyalty to Government, and assured him that the people would in time be grateful to him for his foresight in delivering Shatrah from the wrath of an avenging army which would soon sweep across Iraq, restore law and order, and punish evildoers. He entrusted the sheik with the office that he was laying down.

A few mornings later the drone of distant aeroplanes broke on their ears. It was a welcome sound for the two Englishmen. They began to work to make useless the little arsenal they had accumulated in the house that served as their headquarters. Bolts were removed from all the rifles and detonators from bombs. The Englishmen had just buried these warlike weapons in the sand when the loyal sheik arrived, bringing with him a procession of the faithful leading citizens. Bertram Thomas received them in the house.

There were two aeroplanes droning overhead. The machines

circled round and round the house at a considerable height, thus observing their instructions that they were not to land if there were signs of hostility, but were to go on to Nasiriyah. It behoved Bertram Thomas and his assistant, therefore, to show themselves at once to the aviators.

The two Englishmen emerged from the house. Followed by the sheik, the leading notables, and a vast throng, they passed in solemn procession along the river front, across its dying bed, and on to the landing-ground beyond. There was no demonstration of any kind. Not a sign of disrespect, but rather a hushed dignity about it all. One of the aeroplanes had landed, the pilot prudently remaining in the cockpit, its "prop" "tick-ing over", preparedly.

"There is no danger," said Bertram Thomas to the pilot. "You must come down and be introduced to the sheik."

This was an encouragement for the other machine, which, according to programme, was circling round in case of treachery, to land and follow suit. While everybody chatted amiably, Bertram Thomas read a letter which had been written by his chief in Bagdad and brought by one of the pilots. It read :

Two aeroplanes herewith to evacuate you both to Nasiriyah. You are hereby directed to leave Shatrah by 'plane. No change in conditions subsequent to the despatch of your request by P.O. for your evacuation will be considered by me to justify your remaining, and this must be regarded by you as a definite and final order to leave Shatrah.

Bertram Thomas made a small speech to the assembled Arabs. He said that he would return to them as their *Hakim* as soon as law and order, which could not be long delayed, were restored. Meanwhile he was handing over the reins of office to the sheik.

The Arabs listened attentively. A few moments later there was a screech of accelerating engines and a solid blast of wind against white faces as the two machines raced madly forward and climbed into the air. At length they were gliding down into the British aerodrome at Nasiriyah, and evacuation had been completed without a single shot fired.

There is a fine carefree spirit in the men of the R.A.F. which was seen again and again during the Great War. This spirit is to be found in the airmen of all nations, as the records of the battles among the clouds reveal. Iraq saw many dramatic little episodes.

IV

Some of the most spectacular feats of the R.A.F. since the war have been due to the use they have made of their giant bomber-transport 'planes. There are three types of machines employed for troop-carrying, of which, perhaps, the Vickers-Victoria is the best known. This machine is a twin-engined Napier tractor biplane, and, besides two pilots in the open cockpit, it can carry twenty-two men in an enclosed cabin. The "Victoria" has a top speed at low altitude of 110 miles an hour.

The "Clive" has two 460 h.p. Bristol Jupiter VIII engines, and can accommodate seventeen fully armed men in the enclosed cabin. In addition, accommodation is provided for two gunners and two pilots. All types of troop carriers can be converted quickly to act as aerial ambulances with stretchers instead of seats.

The Vickers-Victoria troop-carriers came into prominence during the evacuation of Europeans from Kabul in 1928. Afghanistan was in the throes of revolution, and the position of the Europeans in Kabul became precarious. It was necessary to evacuate them at once, but a land journey through the Khyber Pass meant that probably all would be massacred by the wild tribesmen. The R.A.F. calmly undertook the job although it seemed at first that they were tackling the impossible.

Before they could begin, suitable machines had to be brought up to the British frontier town of Peshawar. For this purpose big "Victorias" were despatched from Iraq, and the promptness with which they arrived upon the scene of action is an eloquent tribute to the mobility of the Royal Air Force. The first machine reached Peshawar in four days from Bagdad. Then touch had to be established with Sir Francis Humphry in the beleaguered British Legation outside Kabul. The first officer sent over in a D.H.9A was shot down over Kabul, but

fortunately was able to make a safe landing on the aerodrome. Practically every other machine that was sent over to reconnoitre and, if possible, establish communication with the Legation was heavily fired at, and more than one was hit.

On December 22, however, King Amanulla's troops succeeded in forcing the rebel tribesmen back for a time from the ridge overlooking the Legation and the aerodrome. A message came through unexpectedly over the wires from Sir Francis Humphrys asking that the evacuation of women and children might commence the following day. It was short notice, but the request was complied with.

On December 23 three D.H.9A's and the Irak "Victoria" were sent over to Kabul and came back safely with a full load of twenty British women and children. Next day twenty-three French and German women and children were brought out. Thence onward the process of evacuation went on steadily, only interrupted temporarily by the wintry weather and snow, until practically all Europeans in Kabul—English, French, Germans, Turks, and even Russians, together with Afghans and a great number of British Indian subjects to a total of nearly 600 souls in all—had been brought back to India and safety.

But let Sir Francis Humphrys himself tell the story. Something of the suspense of those days was revealed in his speech when distributing prizes at his old school, Shrewsbury.

"It is an epic of the air, unparalleled in history," said Sir Francis. "When all means of communication by land were hopelessly cut off, aeroplanes flew to our rescue from Bagdad, and even from Egypt, covering as much as 1100 miles in a single day. These machines had operated before only in hot climates at a maximum height of 4,000 feet, and they were suddenly called on to fly over snowbound, inhospitable mountains at heights far greater than the Alps, in a temperature 30 degrees below zero, and to land on a strange aerodrome in two feet of snow with a fierce battle raging in the neighbourhood. But never once did they refuse my call. More than 80 journeys were made and 35,000 miles flown with the loss of two machines, and 600 British subjects and foreigners were conveyed to safety without a single casualty."

"There was one exciting incident. King Amanullah, besieged with a garrison of 5,000, was given 24 hours' ultimatum to surrender to an attacking force of 16,000. The alternative was a murderous assault with scaling ladders, no quarter, and a general loot and massacre. The king replied that nothing would induce him to come out unless the safety of himself and his ladies was taken in hand by Englishmen. We had no soldiers and no means of enforcing authority except with our tongues. The aerodrome, situated between the two armies only 400 yards from each other, was raked with a devastating cross-fire. We had to take the risk, and telegraphed for aeroplanes. When the machines arrived in sight we gave the signal to both armies to cease fire. Fortunately for us, they obeyed the signal. The aeroplanes landed in silence, and the king and his ladies, escorted by unarmed Englishmen from the Legation, went to the waiting machines and were flown safely to India. There is no doubt whatever that the R.A.F. by their gallantry on this occasion not only saved the city and the foreign legations from a terrible fate, but probably saved England from another war."

Sir Philip Sassoon, who had been inspecting R.A.F. units in India just before this remarkable air feat was accomplished, also revealed an incident connected with the evacuation which is interesting as illustrating what good results may flow from small and unpremeditated actions.

Some little time before the trouble in Afghanistan came to a head, a Russian aeroplane came down in British territory with engine trouble. This incident was made a feature in the British Press at the time, and it was suggested that there was a good deal of activity going on by Russian spies in India. The two Russians in the machine were taken to Kohat and were here very well looked after by our people, so much so that the Russian Minister at Kabul sent us his thanks for our treatment of them. Our action, although in no way exceptional in character, brought its speedy reward, for when the time came for the evacuations the Russian Minister and his countrymen in Kabul gave us every assistance in their power.

The Vickers-Victorias again triumphed when they were used to carry troops last year to take the place of the Assyrian levies guarding the Royal Air Force aerodromes. For political

motives these levies were threatening to disband themselves. The troops were carried from Egypt and back again when their duty was ended without a single mishap. The R.A.F. transported 14 officers and 534 men of the 1st Battalion Northamptonshire Regiment from Ismailia to Iraq and back, a distance of 1728 miles over practically waterless desert.

The whole affair was carried out according to plan, except that a dust-storm on one day in June caused nine aircraft of No. 70 (Bomber Transport) Squadron to spend the night in the desert west of Ramadi. The weather was extremely hot at the time, and as the aircraft were all loaded to capacity (eighteen men plus a crew of five) the operation involved a considerable strain on both pilots and aircraft.

On the return journey conditions did not prove so difficult. As the return of the troops was spread over four weeks, it was possible to keep the aircraft well within their maximum loads. On the outward trip eighteen Vickers-Victorias were employed, nine being from No. 70 Squadron, Hinaidi, and nine from No. 216 Squadron, Heliopolis. For the return trip nine similar aircraft were used, four from Hinaidi and five from Heliopolis.

In addition to the aircraft for troop-carrying, one was used as a breakdown 'plane and two as reserve. The breakdown 'plane and one spare 'plane were located at Amman, whence the former was able to reach any 'plane that landed in the desert and needed a new engine. This aircraft, which carried two Napier-Lion engines in slings, a breakdown party and a supply of spares, did excellent work in changing engines rapidly in the desert.

Then a medical aircraft was located at Rutbah. It carried a medical officer and a medical orderly, and would have been available, if required, either to the east or the west of Rutbah. Fortunately its services were not needed. Suitable provision was also made for reserve rations and water in the event of a forced landing in the desert.

Keeping order among the Kurds is one of the many little tasks that the R.A.F. have been engaged upon. Reading of these operations conjures up a certain scene in my mind: a group of young flying officers at a table. A map of Mesopotamia was before them. Addressing the group was a sunburnt man, speak-

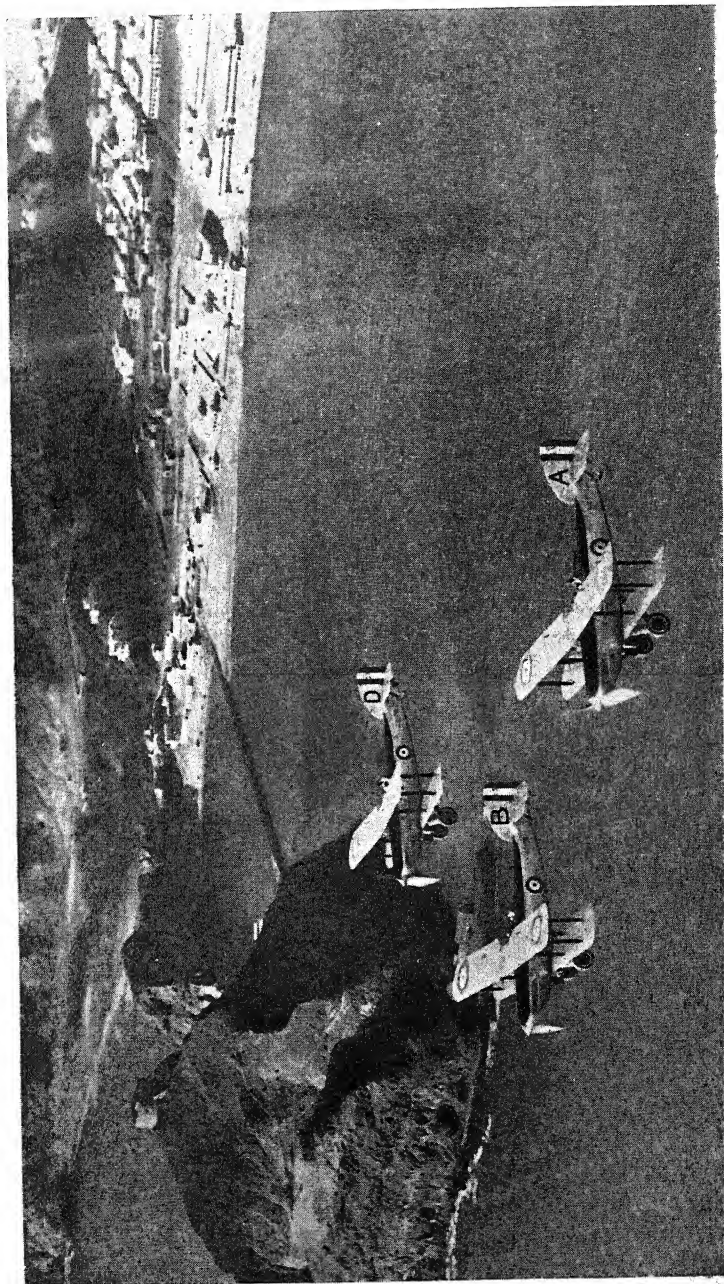


Photo by courtesy R.A.F.]

FATREY III F (NAPIER ENGINES) IN FLIGHT OVER ADEN

[Crown copyright reserved]

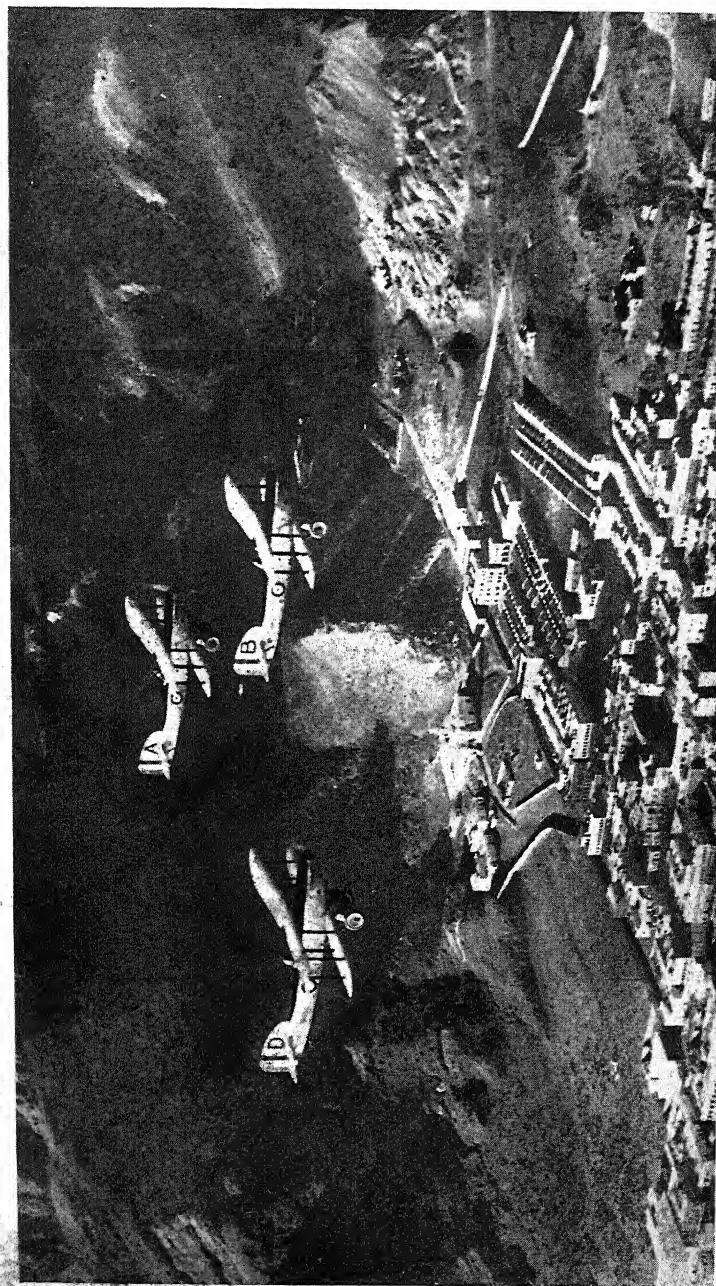


Photo by courtesy R.A.F.]

FAIREY III F. AIRCRAFT RETURN TO ADEN AFTER A SPECIAL RECONNAISSANCE FLIGHT

[Crown copyright reserved]

ing in staccato sentences. At first glance he would be taken for a cavalry officer.

"Gentlemen, here is my final advice," he said. "If any of you crashes with your aeroplane among the Arabs, draw a revolver and shoot as many of the enemy as you can. Save one cartridge to use on yourself. You need expect no mercy. But if you should crash among the Kurds, then forget your prayers and try to remember some good stories. For the Kurds are gentlemen fighters. They'll respect a fallen foe. But they expects prisoner to be amusing."

The man who gave that advice during the Great War was himself stabbed by Arabs. He was Lieut.-Colonel G. E. Leachman, a great name among the Arabs of the Iraq deserts. But the advice is still sound.

The bandits of Kurdistan are the bogies of all in Iraq to-day. They are bloodthirsty men of the mountains descending the passes and slaughtering their Arab enemies without mercy. And the description is fairly true. They are men who believe in massacre, for they have themselves been massacred in thousands. They have held out desperately among their snows and deep passes, shooting on sight. They are a nation that do not exist on the map, for their country is divided between Turkey, Persia, and Iraq. Recently the Kurdish rebel chief, the Sheik of Barzan, descended from his mountain stronghold and laid waste many villages in Iraq. This crime called for action by the Royal Air Force.

These sons of Noah, living on the slopes of Mount Ararat and other snow-capped mountains rising out of the northern deserts of Iraq, have been at war ever since history began. They have fought all the Empires that have ever been founded—Macedonian, Roman, Parthian, Byzantine, Tartar, Persian, Ottoman, and now British.

"To fight is to live," is the philosophy of the Kurd bandit. "We have a saying that grass grows quickly over blood shed in fair fight."

The little war of the R.A.F. last year with the Sheik Ahmed of Barzan, in Northern Kurdistan, is worthy of record.

These were operations in which a small force of British airmen, little more than a squadron in strength, co-operated

with Iraqi air and ground forces. It was not the responsibility of the R.A.F., and the Air Ministry issued no reports except those concerning their own personnel.

Thus, at the time, the capture of two British airmen was reported, and also, happily, their subsequent release, unharmed by an enemy who at any rate is not altogether barbarian. One of the airmen was injured in the shoulder in the forced landing which led to their capture.

With the R.A.F. were an Iraq army column and a flight of the Iraqi Air Force. The ground troops in their northwards march into the mountains at Birisja got into difficulties, for the Sheik, who had waited until the right moment, struck a blow at the supply column far to the rear.

Pilots saw this from the air early one morning, and in the afternoon of the same day the R.A.F. and Iraqi aircraft delivered a low-bombing and machine-gun attack on the rebels. Thereafter for two days the airmen were busy supplying food, blankets, ammunition, and medicaments to the troops, who, deprived of their own supplies, would otherwise have been in a very bad way. The supplies were dropped by parachute in the manner familiar to spectators at the R.A.F. display.

Ahead of the Iraqi troops the Sheik now barred the way, but eventually had to retreat in face of continuous attacks from the air. One British airman was shot down by the rebels.

The two British airmen who were captured were at the time operating with a second column, which succeeded in occupying Barzan. They were the victims of a forced landing, and their capture hastened the end of the little war, for the Sheik took advantage of the occasion to ask to see a political officer. This intermediary was sent to the spot in company with the doctor, whose services were needed for the injured airmen.

Peace now reigns in a region to which it had long been a stranger.

V

The R.A.F. is one of the least advertised flying services in the world. It is the tradition of the R.A.F. that they should do well and far, and say nothing about it. It is only when in the course of their exacting duties some accident occurs that

the newspapers and a sensation-devouring public imagine that the R.A.F. is in some sense the equivalent of the Suicide Club.

To dispel such erroneous ideas, I could wish that some reputable journalist be attached to R.A.F. headquarters for the purpose of telling the world of their achievements. When a flight of Italian seaplanes is sent across the Atlantic, it is to the thunderous applause of the Italian Press and splendid speeches by Mussolini. The more spectacular flights of French military aeroplanes are well advertised. And when officers of the United States Aviation Service attempt a round-the-world flight, the whole world is told through the medium of wireless, cables, and cinema cameras.

The R.A.F. is much more modest. Having seen their work up and down the Empire, and realized the splendid calibre of the men and the machines, I do not hesitate to speak of their achievements. I feel it is a duty that the man in the street, who only sees the spectacular feats performed by the R.A.F. at Hendon once a year, should know something of the great work the Service is doing all over the world.

Consider, for example, the magnificent flight to the Far East made by R.A.F. flying-boats at the end of 1927. True, there were a few favourable comments of the British Press at the time, and a colourless official report was afterwards published. But the importance and value of that flight have never been popularly stated.

These four Supermarine-Napier flying-boats flew from Southampton to Singapore, and afterwards to Australia, round Australia, and back again to Singapore without the slightest mechanical trouble or serious accident of any kind. Actually the flying-boats covered 23,000 miles, or 184,000 engine miles. They accomplished the longest flying-boat formation flight in the history of aviation. It was a great triumph for British aeronautical efficiency. Nothing comparable to this feat had ever been accomplished by any nation.

Each of these Supermarine-Napier flying-boats possessed two 500-h.p. Napier-Lion water-cooled engines to propel them. They enabled the boats to keep to a prearranged time-table, and revealed the reliability and effectiveness of flying-boats in the service of the Empire.

The machines consisted of H M. Flying-boats S 1152, S 1151, S 1150, and S 1149. A glimpse at the terse wording of the log reveals the matter-of-fact manner in which the officers and crew carried out their air epic :

"Friday, Oct. 14, 1927. Felixstowe-Plymouth. 276 miles (4 hrs. 5 mins. ; 68 knots).—Flight left Felixstowe in formation at 09.00, and landed at Cattewater at 13.05 after a rather unpleasant flight in rain and thick mist."

We miss a few days of the log and come to :

"Tuesday, October 25. Naples-Brindisi. 230 miles. (3 hrs. 40 mins. ; 63 knots).—At 07.50 the Flight took off independently in Nisida Harbour.

"On account of the swell outside the harbour, and in order to avoid the cliffs and high telegraph wires, it was necessary to take off down-wind.

"Luckily, the clouds were high, so that the Flight were able to cross over the mountains on the 'Heel and Toe' of Italy at 5,000 ft., and proceed direct to Brindisi, thus avoiding the necessity of following the coast right round, an additional distance of about 220 miles.

"The mooring site, close to the air station, and opposite the civil seaplane station, was quite satisfactory, although rather close to the shipping channel. The buoys were not specially laid, the Flight using ordinary ship moorings."

I will pass over the terse descriptions of the flight over the Mediterranean, down the Tigris Persian Gulf, and the arrival at Bombay. The men and machines were crossing the hottest seas in the world. But the schedule was kept. They were soon experiencing unique adventures.

"Thursday, Jan. 12. Colombo-Trincomali. 290 miles (4 hrs. 45 mins. ; 60 knots).—The duty officer and all airmen slept on board.

"The Flight took off in succession at 08.00, the times varying from 45 to 55 secs., being much the worst experienced so far during the cruise, more especially as the fuel load was only 400 gallons in each machine. The long take-off was due primarily to the thick deposits which had formed on the hull bottoms during the stay of twelve days at Colombo.

"After circling Colombo in formation the Flight left for

Trincomali, S 1149 and S 1150 flying round the south of the Island, S 1151 and S 1152 round the north. Shortly afterwards a torrential rainstorm was passed through. S 1150 steered out to sea for a mile or two, and thus avoided the centre of what was a small cyclonic storm, but S 1149 in the centre of the storm had a most anxious five minutes. The rain, descending in torrents, almost blinded the pilot, who could not see the water above 20 feet. The whole surface of the sea was covered with swirling foam, and the heavy bumps made the aircraft almost uncontrollable.

"The pilot had the greatest difficulty to avoid being forced on to the water, which was too rough for a safe 'landing' and 'take off'. When passing the game reservation on the south coast, a number of elephants, buffalo, boar, sambar deer, and monkeys were seen. S 1149 and S 1150 landed at Trincomali at 12.45. S 1151 and S 1152 passed over Punerin and followed the water-ways across the north of Ceylon and thence down the east coast. The aircraft landed at Trincomali at 12.35 in an interval between the showers."

The effect of those barnacles is seen in the next entry on the log :

"Friday, Jan. 13, to Wednesday, Jan 18. Trincomali :— All the flying-boats were taxied in turn to the shallow water, so that they were just afloat. The officers and airmen of the Flight, assisted by three seamen and six coolies, removed the weed and barnacles from the bottoms with hand scrubbing-brushes and pieces of wood. The barnacles were firmly fixed to the paint, which generally came away with them, and, as most of the cleaning had to be done with the head under water, it was most exhausting. The flight tests showed that the average time for take-off with the clean bottoms was 30 secs., compared with the 50 secs. required with the dirty bottoms at Colombo with approximately the same load and weather conditions. This result was confirmed by 'set off' tests of S 1150 immediately before and after cleaning."

And so the Flight entered upon one of the most dangerous flying areas in the world—the Bay of Bengal.

"Friday, February 3, Calcutta—Akyab. 315 miles (4 hrs. 30 mins. ; 70 knots).—Colonel Sheldermine, Director of Civil

Aviation, India, embarked in S 1151 at 06.30 for flight to Akyab and Rangoon in connection with the proposed Civil Air Route.

"The Flight took off in formation at 07.05, and, after circling Calcutta in formation at 07.25, flew on a compass course over the Sunderbans to Shalpur Islands, and thence down the coast to Akyab. The Delta is jungle, swamp and small paddy fields, with many rivers and creeks where a seaplane could land, but with no landing-place for a land plane. Flight landed in formation at Akyab at 11.35.

Thursday, February 28, Port Swettenham—Singapore. 210 miles (2 hrs. 30 mins. ; 84 knots). His Excellency the Governor of the Straits Settlements (Sir Hugh Clifford) and his staff arrived at Port Swettenham at 14.20, and were accommodated in different flying-boats. The Flight took off in formation at 14.35 and flew down the coast to Singapore. As the Flight flew south the weather became thundery, with bad atmospheric, and several heavy rainstorms were seen in the neighbourhood of Johore Straits. The Flight landed in formation at 17.05 in moderate rain, off the site of the air-base at Seletar, securing to the buoys which had been laid there for them. A large party, including Lady Clifford, the Colonial Secretary, representatives of the General Officer Commanding, and the Senior Naval Officer, had assembled at Seletar to welcome His Excellency the Governor and the Flight. A guard from the base party was put on board the flying-boats for the night, and all the flying crews went into Singapore, where they were accommodated."

If that unemotional log fails to stir the imagination of the reader, I can only suggest a glance at the map. It will be seen that this epic flight is a journey in the tradition of those Elizabethan sailors who wandered far and wide to the glory of England.

CHAPTER IX

BIRD'S-EYE VIEW

I

ANOTHER section of the work of the R.A.F. that has had its effect upon civil flying is that of air photography. Air photography began to develop during the war. Like many other sciences brought into being in the atmosphere of bursting shrapnel and high explosives, it was at first crude and unsatisfactory. But to-day air photography is one of the many means by which the pilots of the great air liners find their way from place to place.

Mapping from the air soon became necessary. The view of an airman, looking down on the earth from above, is essentially different from that of the landsman. Contours are lowered, distances are extended, horizons appear infinite, and until he has accustomed himself to this new vision he is as bewildered as the explorer of the future will be when he reaches the moon.

The air camera is rediscovering the world. For the first time in history we are vouchsafed a new vision of the earth. Thanks to the aeroplane, vast stretches of country never yet mapped are yielding up their secrets, while other parts of the globe about which we thought we knew everything are being rediscovered.

Before 1914 one or two attempts had been made to take photographs from the air, but, as the pilot or his observer had to lean over the side of the machine with an ordinary camera, these attempts were rarely satisfactory. When the first successful aerial photographs of the war were taken—it was at Neuve Chapelle in November 1914—the establishment of this branch of the flying army numbered five—two officers and three "other ranks". By the end of the war there were over 3,000 men specializing in this work, and map-making had become one of the most important of the many tasks entrusted to the Royal Air Force.

So the air camera came into being to fix this bird's-eye view

of the earth. Nowadays these cameras have reached a high stage of technical efficiency. They are automatically controlled, and at a height of 6,000 to 7,000 feet they click off a strip of film which photographs an area of several miles over which the aeroplane flies. It is not easy work. The machine must fly a definitely straight course, while the photography has to be taken at the precise vertical angle to be of any use.

Some of the astounding results of this regular work by the R.A.F. may be seen at the School of Photography at Farnborough. There, in a storeroom, carefully docketed and card-indexed, are photographs taken by R.A.F. machines in every part of the world. Do you wish to see a complete sectional photographic map of the boundary line between British Somaliland and Abyssinia? It is there, the wild mountain ranges looking like a series of writhing tigers amidst the thick scrub. Do you wish to see the effect of bombs upon the headquarters of hostile tribes? Photographs show you the moment of explosion amidst a cluster of clay huts. Or perhaps you are interested in the movements of tanks and armoured cars in the desert wastes of the Sudan? There they are, pictured from above, like an army of toy soldiers arranged by a child.

There are photographs—military photographs—taken above some of the main cities of Europe. Docks, railway lines, canals, rivers, workshops, and the like, all are pictured from the vertical position by the machine flying overhead. A new group of map-readers have come into existence, men who can from one glance at these photographs taken at 6000 feet give you a correct reading of contours, of objects, and what to the ordinary eye appears only excrescences on the earth.

But aerial cameras are rare and expensive. It is not every squadron in the R.A.F. that possesses one. From this little building at Farnborough, above which military aeroplanes are constantly roaring and manœuvring, experts are sent with cameras to all parts of the Empire. Thus, whenever the R.A.F. arrange a cruise of some weeks' duration in a part of the Empire, a photographer and his camera accompanies the flight. And eventually a man is found docketing and card-indexing at Farnborough a series of strip photographs that help in the mapping of some hitherto unknown terrain.

The various flights made by the R.A.F. from Cairo to the Cape have been recorded by the air camera. Such valuable East African ports as Kilindini, Port Sudan, and Durban, are all displayed in the records. And every aerodrome en route from Cairo to the Cape has been photographed by an aeroplane about to descend. These bird men now have their bird maps.

The value of these photographic maps to the civil air lines becomes obvious. Not only did R.A.F. machines pioneer the Indian route and the Cape route, but also R.A.F. cameras went in advance and revealed the country better than any existing maps could have done. These air maps are available to all who have a legitimate desire to use them. The School of Photography at Farnborough is doing work which must be ranked in importance with that of the Ordnance Survey. From many an angle it is a very fascinating place, and I, personally, have more than happy memories of a most instructive week-end spent in gleanings what information I was able to acquire, under the guidance of a very kindly and hospitable Wing Commander.

Despite this world-wide mapping by the R.A.F., no complete air map of Britain yet exists. This alone would be a titanic task, even assuming that the necessary cameras were available as well as the necessary aeroplanes and personnel. But many important centres have been photographed, and certain areas are now prohibited flying areas. Moreover, air photography in Britain is possible only perhaps about thirty days in the year. Air photography, to be of any utility, must be at a height of 6000 to 7000 feet. And how few are the unclouded, blue, sunshine days when this is possible even the ordinary man can appreciate.

"Curiously enough, those thirty perfect days are usually Sundays," one of the experts explained to me. "I know, because I've checked them."

Which is another reason why the air map of Britain is still incomplete. Even the R.A.F. believe that Sunday in Britain should be a day of rest.

Nowadays the air photography of the R.A.F. is limited to purely political work and instruction. The mapping of the British Somaliland and Abyssinian boundary line was an example. If this had been undertaken by the usual ground

methods of survey chains, and the rest of the paraphernalia, it might easily have taken ten years in such wild and forbidding country. By calling for the assistance of the R.A.F. 'planes, the work was done in less than three years, and complete maps are now in the possession of the Foreign Office.

R.A.F. aircraft were also employed on similar work in this same region some time previously. They worked on frontier delimitation on the borders of Italian and British Somaliland, and the evidence supplied by them was taken as final in all cases under dispute.

It is, of course, necessary for a group of landmen to work in co-operation with the machines. In wild country certain points are defined. A swirl of scrub is cut by natives in the form of a T. An aeroplane flying over this part recognizes the mark, and begins operations from that point. Once these points are fixed, the work proceeds rapidly, and the accuracy of the air map has already made obsolete the rough maps of early explorers and other military mapmakers.

It is one of the paradoxes of air photography that what the eye cannot see close to the earth is revealed by a camera at 10,000 feet. Owing to the effects produced in a photograph by variations in contours, colour, and texture of a surface, these photographs have often discovered much of interest to archaeologists. It was the R.A.F., for example, who solved the riddle of the avenues at Stonehenge by an air photograph that showed clearly the course of the ancient paths of which no trace appeared visible on the ground.

Then, again, it was one of the R.A.F. cameras operated from the air that has emphasized the probability that the Israelites when fleeing from Egypt to the Promised Land took a route nearer the Mediterranean coast than the one hitherto accepted by Biblical historians.

This new theory of the Israelites' real route out of Egypt has been expounded after some years' study on the spot by the present Governor of Sinai, Major C. S. Jarvis. He has travelled by aeroplane over the route taken by Moses, which was along the Mediterranean coast. He points out that Yam Suf, or Lake Bardawil, just beyond the Suez Canal, is really an enormous clay pan about six to ten feet below the level of the

Mediterranean Sea, and separated from the sea the whole length by a very narrow strip of sand which varies from one to three hundred yards in width. It was in this lake, and not the Red Sea, that Pharaoh and his men were engulfed.

At the present moment the lake is used as a mullet fishery and is kept filled with sea-water by cutting channels through the sandbank, but the normal condition of the lake is a vast salt-encrusted pan. During the Great War, when Sinai was invaded by the Turks, the fishing in the lake was stopped, and it soon returned to its habitual state—the channels connecting it with the sea silted up and the lake very quickly dried, leaving a salt clay surface which would not support a car, though many unwary drivers thought it would. During gales the sea broke through from time to time and flooded the lake, but the breaks silted up and in a few months it was dry again. So here we have a narrow sandy pathway along the sand-strip which leads directly to the cultivable part of Northern Sinai by El Arish, and which is still one of the main tracks to El Arish and Palestine.

When the Israelites decided to leave their bondage they began by crossing a tributary of the Nile near Port Said. Then Moses had to decide whether he would take the route to Jerusalem, or take the track that lies along the sea-shore of the Mediterranean. Both these tracks are used by the Arab camel-men of to-day.

Moses decided upon the route by the sea-shore, which had the advantage of being further away from the Egyptians, and thus provided him with a few extra valuable hours in his flight. The ragged army with its goats and sheep kept alongside the sea and marched towards the glittering lake Bardawil.

While the tide was out the Israelites crossed in safety. The Egyptians, with their chariots, began to cross when the tide was turning. In the soft sand the wheels of their chariots stuck, and in a few moments the waters of the Mediterranean were engulfing them.

This meeting of the waters at Lake Bardawil has been photographed by an R.A.F. machine. It is one of the most remarkable photographs ever captured from the air, and proved the biblical story in astonishing fashion.

The air forces of the Dominions have also been useful in photographic survey work, particularly in Canada and Australia. The Royal Australian Air Force, with the help of the Australian Navy, some time ago undertook a photographic survey of the Great Barrier Reef. It was this same air force that proved by the same means that Lake Eyre is not a lake at all, but that for five years out of six it is solid ground.

The use of the aeroplane in spotting submarines was emphasized during the war. Often when flying over the sea an angle is given to the pilot which permits him to see well down the depths. This angle of vision is already being exploited by salvage workers in the discovery of submerged wrecks.

Consider the case of one of the greatest of sea mysteries—the disappearance of the *Waratah*. It was on July 26, 1909, that the *Waratah*, on the way from Australia to London, put to sea from Durban in South Africa. The next morning she was seen by a Clan liner, but from that moment the great liner, with ninety-two passengers, a crew of 119, and over 10,000 tons of cargo, was never seen again. The disappearance of the *Waratah* became one of the greatest sea mysteries of our time.

Subsequently several expeditions were formed for the purpose of solving the mystery. Both the Government and the owners did their best to discover some clue to the final disaster which had overtaken the ship. Some of these expeditions went so far as to journey into the wind-swept wastes of the Roaring Forties and even to the far-away Crozet Islands. They followed the theory that the ship might have drifted in the powerful currents that lie off Cape Agulhas.

But it was not until 1925, when the Union Government's first experimental air mail service was in operation along the coast of South Africa, that the possibility of visualizing these depths from above presented itself. This air mail was conducted by Government 'planes, piloted by Union Air Force officers. It was one of these officers, Lieutenant Roos, flying the air mail from Port Elizabeth, who reported that he had seen the wreck of a huge liner lying on a shelf of rock deep in the ocean. In his opinion there was no doubt that this wreck was that of the ill-fated *Waratah*.

Subsequently Lieutenant Roos, in company with another



Photo by courtesy R.A.F.]

[Crown copyright reserved.

LONDON FROM 23,000 FEET

SHOWING HIGHGATE PONDS; PARLIAMENT HILL; REGENT'S PARK
WITH THE ZOO; LORDS CRICKET GROUND, AND EUSTON STATION



Photo by courtesy R.A.F.]

[Crown copyright reserved]

LONDON FROM 23,000 FEET

SHOWING THE THAMES FROM VAUXHALL TO BLACKFRIARS; BUCKINGHAM
PALACE AND ST. JAMES'S PARK; ALDWYCH; LINCOLN'S INN FIELD
WATERLOO STATION AND KENNINGTON OVAL.

officer, tried to discover the location of that wreck once again from the air. But he was unsuccessful. Then came an ironic sequel. Lieutenant Roos, a gallant man who saw service in the Air Force in Egypt, and passed through all the dangers of a long flying career, was killed in a road accident. With commendable enterprise, the well-known South African newspaper the *Star* organized a further aerial search. But although some hundreds of hours of flying took place over this stretch of sea, that extraordinary vision vouchsafed to Lieutenant Roos was never again revealed. It remains, perhaps, for some other chance aerial traveller to solve the great mystery of the *Waratah*.

But every day some secret of antiquity that has remained hidden for centuries is being brought to the knowledge of men by the aeroplane camera. In Great Britain, the Middle East, and other regions throughout the Empire, the air-borne camera is revealing details of towns, settlements and works of olden times that are assisting archæologists mightily in their reconstructions of the world as it was twenty or more centuries ago. The earth may have been turned over countless times by the plough, but from above the ancient outlines can still be glimpsed.

Much work was done recently in Britain along the line of Hadrian's Wall, constructed during the Roman occupation nearly two thousand years ago to keep back the barbarians living north of the Tweed. Royal Air Force pilots flew along the line of the wall and took a series of photographs as part of their regular Service training. The results were surprising, and archæologists received them with delight. Four camps, previously unknown, were discovered; parts of the wall and the accompanying earthen rampart were shown in much greater detail than the most painstaking ground-survey had revealed; and the big settlement which sprang up outside the Roman camp of Borcovicus was outlined in such detail that antiquaries may reasonably claim that the plan of it is as well known to-day as it was to the settlement's inhabitants. Points in dispute, such as the precise location of the earthen rampart at one of the chain of forts along the wall, were settled firmly by the air photographers. Other sections of the wall will probably be carefully surveyed from the air in the near future.

The archaeology officer to H.M. Ordnance Survey, Mr. O. G. S. Crawford, recently reported some astonishing discoveries by these young archaeologists of the air.

"A considerable number of Bronze Age and other camps, previously unknown, have now been identified near Salisbury and in other parts of Wiltshire," he said, "while a further section of Watling Street has been discovered in Kent.

Fields of oats show up the old camps particularly well. This is caused by the parching of the ground over the foundations of the old walls, houses, and streets. The corn grows less well, and shows up as a white band. The best results are obtained by photographing in the early morning or late in the evening when the shadows are long. In each case where the sites have been excavated afterwards the plans revealed in the air photographs have been confirmed absolutely."

I have seen several of these extraordinary archaeological photographs. In some of them groups of Celtic fields, the exact line of Roman roads, and traces of earthworks have been revealed, completely upsetting some archaeological theories.

One photograph, taken in Warwickshire, showed details of an ancient system of cultivation. It revealed curved rows of hawthorn-trees following unploughed ridges of turf and weeds, sweeping curves believed to be caused by the eight-ox ploughs as the teams were pulled round at the turns.

All this work, which has been accomplished by the R.A.F. in the course of their ordinary duties and training, has emphasized the necessity for some co-ordination. It has been suggested that an Imperial Air Survey Association should be formed with the object of tapping hidden sources of wealth in unmapped parts of the Empire. At present some four-fifths of the Empire are mapped on an inadequate scale, and much is not mapped at all. The aim of such an association as set forth by Mr. H. Hemming, a leading authority on air survey, would be to do for the Empire something akin to what the Ordnance Survey Department does for Great Britain.

Mr. Hemming points out that practical experience supports the chief claim put forward for air photography that it combines in a single operation means of obtaining information on many economic aspects. It provides detailed maps on a variety

of scales to suit the needs of every Department of State engaged in development work; it enables geological maps to be made; and it indicates localities in which mineralization is likely to occur.

Air survey also indicates the zones in which soil conditions are favourable for agriculture, zones in which forests should be preserved for commercial or protective purposes, and the most suitable alignment for railways and roads. As British air survey companies have to a considerable extent built up their experience, equipment and reputation in carrying out air surveys for foreign countries, it would be a serious drawback if air survey were to be taken over by the Government itself. For these and other reasons, the Imperial Air Survey Association was proposed.

II

At this point we may consider the extensive and very valuable work that is being done in air photography and air survey work by the well organized and equipped British companies. In Great Britain, which is generally recognized as possessing the finest survey in the world, there has been little scope for practical work on a large scale, and activities have to a large extent been carried out by two private companies, the Aircraft Operating Company and the Air Survey Company. Already aerial survey expeditions have carried out most successful work in the Sudd region of the Nile, in Northern Rhodesia, in British Guiana, Burma and Borneo.

Before describing some of the remarkable achievements of these commercial companies, it is worth paying some attention to the camera equipment used. Accurate work in aerial survey requires the taking of a large number of photographs at exact intervals of time. The camera is therefore made so that it is automatic in its action. It is worked by a variable control driven from the engine, the shutter being released at the required intervals of time by means of an electrical contact. At the same time lights are switched on in a small box at the side of the camera and a photograph is taken simultaneously of the reading of instruments in height, time and the like, in this box.

The aeroplane is flown along a series of parallel lines over

the ground to be mapped, and photographs are taken at regular intervals in such a way that more than half of the ground covered by the first photograph is taken in the second and so on. Photographs can be taken either "vertically" below the aeroplane, or "obliquely" backwards under the tail, and to right and left. The "vertical" photograph shows an exact square of the earth's surface immediately below the machine, and is, therefore, practically a plan with a uniform scale, while the "oblique" photograph shows the ground extending away to the horizon, and gives a similar view to that obtained from a very high building.

However, even these photographs, complete though they may be, are not sufficient for the perfect map. A perfect line map cannot be made from photographs without corrections being made in view of the fact that the tops of hills appear on a larger scale than the bottoms of valleys, while ground above the level is moved outward from the centre. As the photographs are taken with an overlap two directions can be obtained for every point, and its correct position determined by method of intersection and maps then drawn accurately in scale from the photographs.

Most survey experts have now come to the conclusion that for all except the final stages of development the most useful type of map is a photographic one, and not a normal drawn map. These photographic maps are made up by piecing together accurately scaled portions of the photographs taken in such a manner as to produce a complete picture of the ground to all appearances like a single photograph. These maps can be produced more cheaply and quickly than the drawn maps, and the special features, interesting from a town-planning, agricultural, forestry, or geological point of view, can be picked out at once.

The most useful property of aerial photographs is that owing to the overlap the photographs can be viewed through a stereoscope, which make the hills and valleys stand out as if there was a plaster model laid out complete in every detail. It is possible to measure the different heights. Contours can also be drawn on maps. In the stereoscope vision of a countryside in which a new town is projected, the engineer can see at once where to lay drains, make roads, and develop existing townships.

The development of infra-red photography is likely to have an immense effect upon aerial camera work. An aerial camera film or plate which can photograph objects invisible to the human eye has been tested by one or two governments. The film, specially sensitized, has a photographic range of more than 200 miles. It is claimed that it may revolutionize modern warfare by enabling airmen well out of range of the most powerful guns and field-glasses to disclose secrets far behind the enemy's lines.

The film, which is made at the Eastman Kodak works at Rochester, U.S.A., is sensitized to the invisible infra-red rays of light. These rays penetrate intervening atmospheric haze and the smoke of forest fires and enable the photographing of objects so far away as to be invisible to the human eye. Captain A. W. Stevens, of the United States Air Force, while flying at a height of nearly 17,000 feet in Oregon, took a photograph of Mount Rainier, 227 miles away. The camera has also been operated at San Diego, California, where an object 175 miles away was photographed.

Actual prospecting can be done from the air. The general view from an aeroplane reveals patches of vegetation of varying texture and thus shows the area where there is different soil. An examination of the soil will determine the rock underneath, and it can be assumed that these variations appearing in a photograph of large area mean the same geologically. Thus the ground prospector is saved an enormous amount of trouble. Aerial photographs are also of incalculable value to the engineer who projects a new route for road and railway.

Wonderful work has been done by the air-camera in keeping rivers navigable. In the East, river mouths are frequently deltoid, and of the many branches only one or two may be suitable for shipping to proceed along. Even these must be dredged continually. Periodically the river comes down in flood, and the delta, instead of being a network of tiny "mouths", becomes a dreary stretch of muddy waters. Channels are hidden, and often begin to silt up.

It would not be particularly difficult to clear and dredge these channels providing they could be found. But marking buoys have been swept out of place, and everything is chaos. When photographed from the air, however, the arms of the

delta show through the flat mass of water like human bones in a radiograph. Further, the variations in the "depth" of the photographs show exactly where the silting has occurred. It does not need an expert to appreciate the great advantage of this modern method over the old system of sending men out in boats to feel for the channels with a sounding-line.

The work of one of these commercial concerns, the Aircraft Operating Company, Ltd., is of obvious Empire importance. Two years ago the company was engaged in the completion of the large air survey of the city and district of Rio de Janeiro, Brazil, and in the preparation of maps for the survey of towns in Northern Rhodesia. The Rio de Janeiro survey was carried out by means of a combination of ground survey methods and air photography, and proved to be a complete technical success, the contract being completed in less than four years, whereas it is estimated that by normal methods it would have taken at least twelve years.

The oblique mapping contract involving an area of 65,286 square miles, entered into with the Northern Rhodesian Government, was successfully completed, the work having occupied about eighteen months. In addition, the company completed the survey of the townships of Nchanga, Ndola, Luanshya, Mufulira, Nkana, and Mpika Road on a scale of 1/5,000, and there has already been a demand for these photographic maps from mining corporations. During the progress of the work in Africa, one of the company's experts was attached to the Northern Rhodesian Government Economic Survey Unit for the purpose of interpreting the photographs as regards indications of wild life and so on, and was able to demonstrate the value of this subsidiary use of aerial survey.

The Air Survey Company, Limited, also successfully completed work in areas which are impassable even to explorers. This company's operations have been extensive. It has worked in India as well as in Africa. A survey of the Upper White Nile, begun three years ago, was extended to Uganda and the Belgian Congo. This immense area was photographed rapidly and the maps delivered in record time. The completion of these maps of a country so difficult of access and within so short a period, in spite of bad weather and interference from the smoke

of grass fires, was a further tribute to the value and practicability of air survey. These maps have received the unqualified approval of the Governments concerned.

This aerial survey of the White Nile is an epic story in itself. The purpose of the survey was to provide the authorities in Egypt and the Sudan with data for new development schemes, and particularly for the irrigation of the cotton fields.

It necessitated machines flying over that deadly Sudd area, a vast swamp on the Egyptian-Sudan borders. This belt of swamp has always been a dreadful barrier to travellers, and at present has to be navigated carefully by steamers. I am aware of only one party of explorers who successfully negotiated this region by motor-car. It included Major and Mrs. Court-Treatt, the first pioneers by motor-car of the journey from Cape Town to Cairo. Most other travellers drive their cars aboard a ship through this region.

The authorities have considered the possibilities of a new channel through the Sudd swamps, or perhaps the creation of a canal by-passing this region. To discover whether this was practicable, air-mapping was essential. But the task undertaken by the Air Survey Company was one of the biggest ever attempted. It necessitated mapping 50,000 square kilometres. Flying operations began at the end of 1929. The machines used included Fairey III F's and Puss Moths. Altogether there were four aeroplanes, five surveyors, two pilots, two engineers and two photographers. This small personnel, although suffering acutely from malaria at regular intervals, successfully completed this almost superhuman task.

But not without its toll of lives. In July 1931 a terrific tropical rainstorm brought down one of the Fairey III F's into the Nile. The machine plunged into the water and half submerged. None of the crew was injured by the descent. One by one they climbed to the upper wing of the aeroplane. Nevertheless, their situation was precarious. The three men clinging to the wing decided that their only hope was to swim for it. One by one they dropped into the river and struck out for the distant bank. But they were caught in the deadly swirling currents of the Nile. Only one man was successful in reaching the bank. The other two were drowned.

Altogether this work in the Sudd area was carried on with difficulty. Both water and swamp in this region are a dull brown or green in colour, while the plains which border it vary from chocolate to black where there have been bush fires. These tints are extremely difficult to photograph. Nevertheless, the work was done, and the Egyptian Government paid the company a great compliment upon its completion. The entire equipment in this work was British.

Major R. Kemp, who organized the survey for the company, describes the area surveyed as consisting of three zones. The first was a grass plain east of the Bahr el Jebel and extending to the Abyssinian frontier. In the wet season this is covered with long grass, and photographs reveal nothing. In the dry season, the grass vanishes, and the natural water channels are visible, usually as mere stains on the ground. The drop may be only six inches in 200 yards, but the photographs reveal all that the irrigation engineer wishes to know. It would have taken many years to survey this region by the usual methods.

The Sudd itself was another zone. It is always wet, and it would have been practically impossible to survey it completely except from the air. The photographs revealed the course and size of rivers never before surveyed, and have disclosed rivers that were not even known to exist.

The third region surveyed was part of the basin of Lake Albert. It is hoped to construct a great reservoir of Lake Albert, and a canal, using natural waterways to some extent, to the Nile. The course of the canal can be decided on the basis of the maps made from the photographic survey, and the work can begin at least ten years before it would otherwise have been possible.

Altogether, six pilots carried out this survey, usually three at a time. Part of the work was commissariat—taking food, water, fuel and supplies of all kinds to the actual mapping parties. Most of the photographic work was carried out from a height of 12,000 feet—over two miles.

This company also controls the Indian Air Survey and Transport, Limited, which is regularly employed in cadastral survey and the preparation of cadastral maps on a scale of sixteen inches to the mile. At the beginning of last year they

were engaged on the completion of the field work and photography of an area of approximately 2500 square miles in the United Provinces, and before the close of the flying season in April an area of approximately 760 square miles was also completed in the Rangpur District of Bengal. Immediately weather conditions became suitable after the monsoon the photography was commenced of another block of country in the Rangpur District, approximately 900 square miles in extent, and contracts for the survey, on a scale of thirty-two inches to the mile, of a number of towns in the Punjab were also arranged.

III

But it is the adventures of the men behind the aerial camera that one would wish to record. Actually these flying cameramen are excessively modest. Their job is the day's work. But that day's work, when conducted from the roof of the sky in a machine that is travelling at a hundred miles an hour, can be really exciting.

These flying cameramen are prepared to go anywhere at any hour. Their services are particularly in demand by Fleet Street, which early recognized the news value of the aerial photograph. So it is that many of these fellows sleep with a loaded camera and a telephone at their bedside. A few staccato words, "Get the pictures!" and they are clambering into the cockpit of a machine and heading towards the disaster, exciting event or pictorial panorama that is wanted.

And the news-reel film companies also have their aeroplanes and ubiquitous cameramen ready. The moving picture from the air of the Derby, the Grand National, of a great fire or a motor race is now such a regular event on the screen that many of us are apt to forget the men and machines behind this modern miracle. A mutiny breaks out in Dartmoor Prison. Within a few hours of the news being received an aeroplane with its cameraman is droning above the scene. A wreck occurs off the coast. Even while lifeboatmen and coastguards are fighting to reach the vessel, the air photographer is hovering, hawk-like, above.

One of these days the value of air photography will be

recognized by Scotland Yard. There are occasions when an air photograph might reveal clues which the detective on the ground has missed.

Sir Alan Cobham in his early days was not only a pilot but also a photographer for one of these early British companies. He now has in his possession one of the best collections of air photographs in the world. He has travelled most of the Empire routes, and always his camera is with him. He has also taken cinema photographs on some of the most exciting journeys that even the adventurous cameraman could wish for. There is still a fine film in existence taken by the photographer Emmott during Cobham's first flight to the Cape. The long sinuous Nile, with dhows on its broad waters, the old ruins of Luxor, and the Valley of the Kings, the great lakes, the ranging herds of elephants and giraffe, crazy native villages, the Victoria Falls and its spouting cataracts—all these were pictured by Emmott as he sprawled on the floor of the De Havilland machine and captured them with his long-range aluminium camera.

Sir Alan Cobham subsequently worked for Aerofilms, now one of the biggest organizations of its kind in the world. Some indication of the extent of that work may be gained from a recent year's activities. Aerial photography undertaken for municipalities includes a complete set of oblique views of the city and port of Hull, which were reproduced in connection with a campaign to attract more industry and business to the Humber. There was also an increased demand from consulting and civil engineers and from contractors in connection with public services. For example, there was an aerial survey undertaken for the contractors, by oblique views, showing the progress of work on the East Lancashire arterial road connecting Liverpool and Manchester.

One of the most important survey contracts undertaken by Aerofilms was for the preparation for the London Electric Railways of a mosaic map on a scale of twenty-five inches to the mile covering the route of the new Underground extension from Finsbury Park to Cockfosters, a distance of nine miles. This involved the taking of 180 vertical photographs. Special commissions for advertising and publicity purposes included

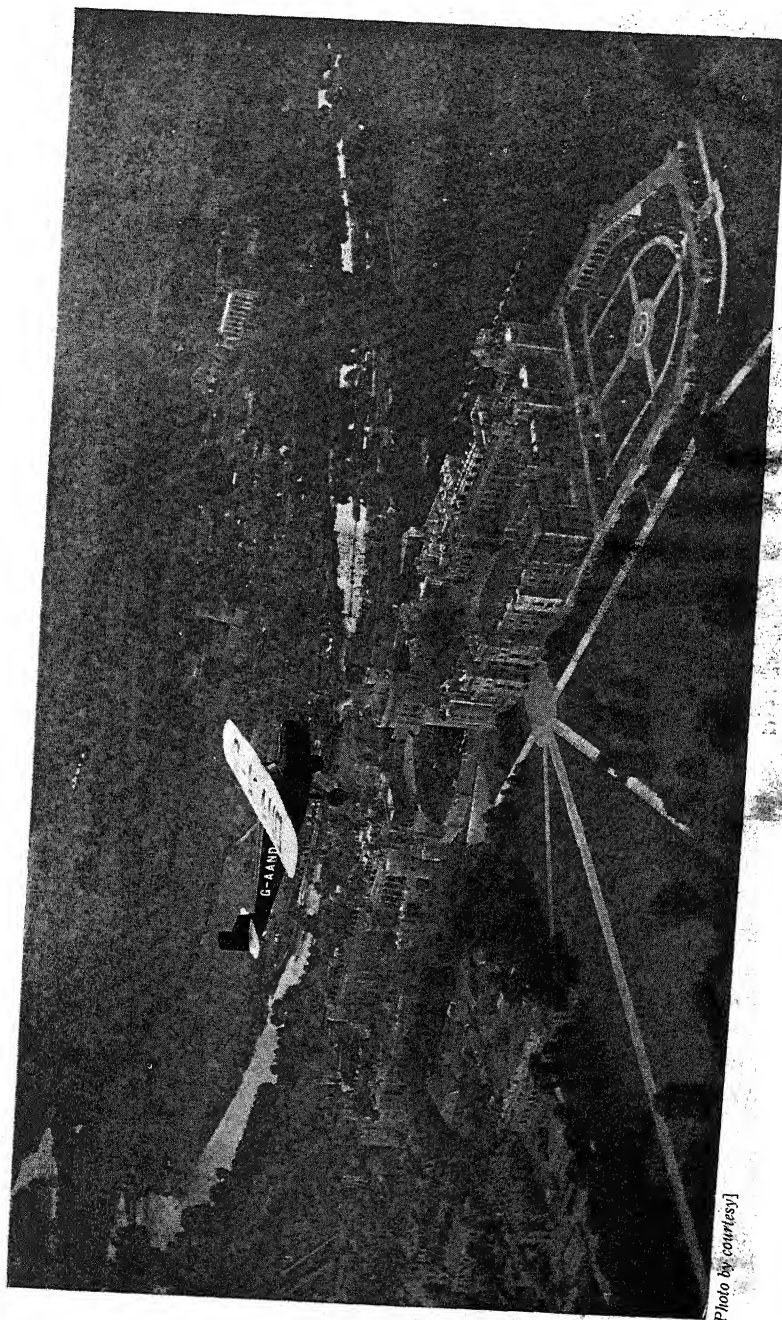


Photo by courtesy]

WINDSOR CASTLE

["Fight"]

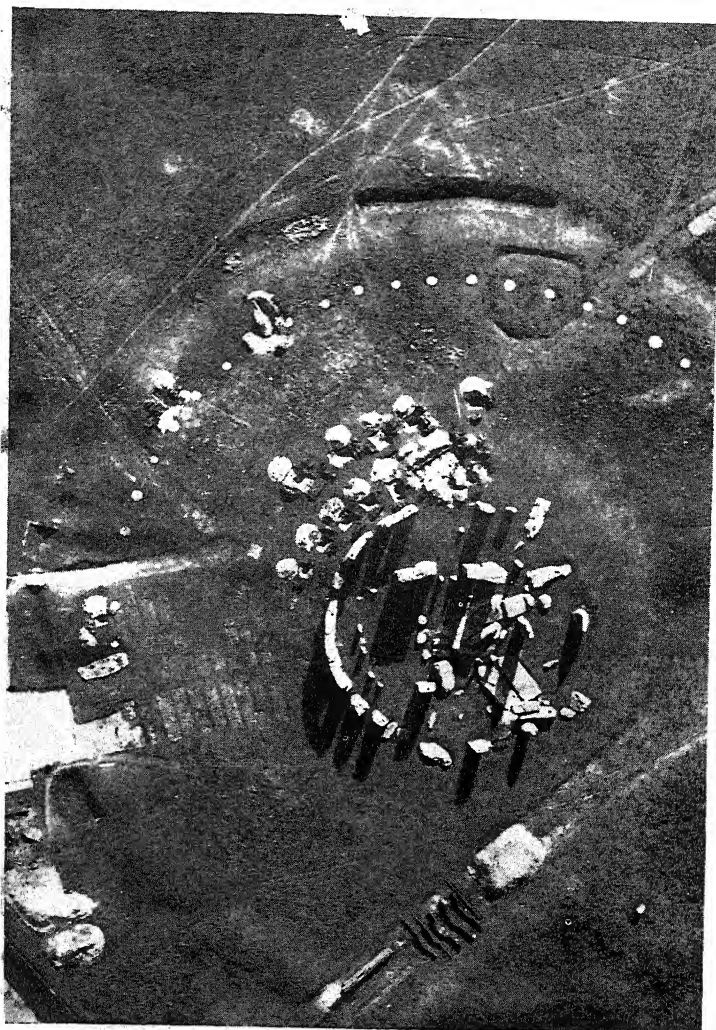


Photo by courtesy R.A.F.]

[Crown copyright reserved

STONEHENGE. AERIAL PHOTOGRAPHY HAS RE-DISCOVERED A LOST
AVENUE LEADING TO THIS GREAT MONUMENT

orders for photography of factories, oil storage depots, gas plants, scientific research farms, eighteen industrial housing estates in the provinces, and housing developments around the outskirts of London. Moreover, further archaeological surveys were made during the same year.

One of the leading spirits in this go-ahead concern is Mr. F. L. Wills. A man of many adventures. He has been flying for some seventeen years, and was spotting submarines in the North Sea in his early youth. When the war ended Mr. Wills, like thousands of other Air Force men, looked round for a job. He couldn't find one, so he decided to start Aerofilms.

It is to the credit of Mr. Wills that he settled a long-standing controversy regarding the spire of Salisbury Cathedral. Architects had long suspected that the famous spire was slightly out of the vertical, but it remained for Mr. Wills and his camera to prove it.

This is his story :

"I was flying once above Salisbury Cathedral and I took photograph of that wonderful old building. There had been, although I didn't know it at the time, a great controversy about the spire. People had dared to suggest that it was a little out of the true. The spire, as seen from the ground, showed no defect. But when my photograph was printed there could be no further argument. Definitely and unmistakably the top of the spire leant away from the perpendicular."

Aerofilms indulges in all kinds of extraordinary tasks. For a number of years, on Derby day, they have helped the Metropolitan Police to control the traffic at Epsom. They worked in conjunction with the mobile section of the police, wirelessly down from 'planes to cars, and taking photographs also.

For ordinary records from the air without elaborate apparatus, I have found the Williamson Pistol Camera gives excellent results; it is stoutly made, easy to use, and a product of London town.

American newspapers and news-reel companies use the air photographer much more regularly and extensively than is done in Britain. For one thing, the American continent is

ufficiently big to make the aerial transport of pictures almost a necessity. And because of this necessity, and the extensive area of their travels, American cameramen have had adventures in plenty.

There is the well-known aerial photographer, Sydney O. Bonnick, for example. His adventure happened in Mexico, where he was drying some film after a week's hard flying over the jungles. The inevitable revolution broke out. In the midst of his work, Bonnick suddenly found himself surrounded by swarthy, dark-eyed revolutionaries, toying with well-oiled rifles. The *commandante* strolled in and, twisting his moustaches with an authoritative gesture, told Bonnick that he was under arrest.

Bonnick went on with his work, but suggested to the *commandante* that further details would be appreciated. The *commandante* indicated the aeroplane. If Bonnick would condescend to fly the machine with an officer aboard over the enemy lines and take a few important photographs, he would be allowed to resume his legitimate work. Bonnick bluntly refused. The *commandante* promptly jailed him. For ten days Bonnick contemplated clay walls.

Finally a corporal's guard marched in and told Bonnick to follow them. The unfortunate cameraman was only too sure that he was going to be shot, and when they marched him up to a blank wall he had no further doubts. But, for once, there was no order to halt. The guard marched on with Bonnick in the midst, and eventually presented him to the revolutionary general. It was that much-uniformed and bedecked individual who told Bonnick that he was a free man.

When this cameraman had finished his work in Mexico, he flew towards the snowy wastes of Labrador in six jumps. There he mapped thousands of square miles that had never seen an aeroplane before. Such is the air-photographer's work. In the tropics one month and in the Arctic Circle the next.

The American Army Air Corps, like the British, is looked upon as a source of supply for mapping experts. Two officers have come to the front in recent years as acknowledged experts—Captain A. W. Stevens and Lieutenant George W. Goddard. Each has done a good deal of scientific expedition work.

Stevens and Lieutenant Walter Hinton, of transatlantic fame, invaded South American jungles to explore the headwaters of Brazilian rivers. Goddard undertook a dangerous mission in the Philippines, landing at weird-sounding places and studying lost Malay and Polynesian races.

Lieutenant Goddard, inventor of the spectacular method of night aerial photography now used by the army, nearly lost his life—and Stevens nearly lost his too—just before sailing for the Orient on this mission. They had gone up, with two civilians representing a flashlight powder concern, to test night flash-bombs. These bombs hold about forty pounds of highly explosive powder. One of them fell out of the bomb-rack soon after the 'plane had taken off from Dayton, Ohio, one dark night, and exploded beneath the 'plane's wing.

The result was as bad as a direct hit with an anti-aircraft shell. It jammed the controls and threw the 'plane into a convulsive skid. Lieutenant Eugene C. Batten, one of the Air Corps' most skilled pilots, was at the stick. He nearly wrenched the steel tubing apart trying to free the controls while the ship ploughed downwards through the darkness.

Back of him, in the 'plane's interior, Stevens felt the floor give way beneath him and grabbed for a pair of bracing wires. You can still see the marks of those wires in Stevens's palm.

Goddard was knocked to the rear and fell semi-conscious on the floor. His foot went through the fabric fuselage and stuck there. Beside his head was the hole in the floor. Nobody could cross it to rescue him; his foot thrust through the fabric was the only thing that kept him from falling into space. The others, clinging to the tubing that was not bent out of shape by the blast, waited breathless while Batten wrenched and jerked at the controls. The 'plane wobbled about in crazy lurches. Somehow Batten brought the crippled 'plane under control and landed it without further injury to his passengers.

One of the foremost requirements for an aerial photographer's job is the ability to laugh at danger. Working on the roof of the world, bending over intricate instruments in a temperature of 50 or 60 degrees below zero, hopping from fever-infested jungles to the biting cold of the Arctic, he must take things as they come.

CHAPTER X

YOUTH AND AVIATION

I

THE future of aviation is with youth. But then, aviation has made the old nations of the world young again. It is impossible for a man to feel old when he is climbing the skies at over 100 miles an hour. To have the wind of speed on your cheeks, to feel the tears streaming from the eyes with the tang of speed, and to hear the shrilling of ailerons as you swoop towards the earth again—these experiences make the oldest of us youthful again.

But aviation appeals to youth. They have not, like our generation of the war, had to learn to be air-minded. They are air-minded. A father murmured to his son at an air display the other day, "There were no aeroplanes when I was young." The boy looked up and quickly asked, "How did people fly, then, Daddy?"

And when one takes wing over the new countries of the world—Australia, South Africa, Canada—it becomes increasingly obvious that the air is the very essence of those countries. It is the real element for transport. In the lands of wide plains, of deserts, of veld, of mountain ranges, the air is the only medium through which the pioneer can really conquer.

Because of this, the young Dominions of the British Empire are forging ahead in their air development. The atmosphere of youth in those countries sends their men climbing the skies. The surging speed of the modern aeroplane appeals to youth. Those people who decry the modern youth should see them as I have seen them, on the aerodromes, in the air, manœuvring the fastest machines in the world, conquering the skies and revealing themselves as healthy and formidable as youth has always been.

There is a calm courage in these youths of the air world which catches at the heart of older men like a sudden, transient gleam of beauty. Perhaps there is something boyish in the manner with which they garb themselves in white overalls and then promptly smear themselves with oil through bending over some pulsating piece of mechanism. But withal these boys have guts—and only the anæmic critics of modern youth will shy at the description.

Some of these boys have paid a heavy price for their conquest of the skies. During the war, when boy battled against boy, the massacre of men and machines was too terrible to contemplate. But although man's introduction to the air began with murder in the air, he did at long last triumph. To-day the enthusiasm and inexperience of youth still pays in blood for air conquest, but out of the debris of these tragedies there comes, phoenix-like, more youth to carry on the great battle.

The aeroplane has come to stay. Every month the machine, with youth at the prow, conquers the sky anew and goes on to seek fresh conquests. Aviation has a future which makes the brain dizzy to contemplate. One can safely leave those future conquests to our youth of to-day.

II

No one has inspired the youth of the Empire more with air-mindedness than the Prince of Wales. He is to-day, in every sense, the Flying Prince. Royalty must now work harder than the hardest-worked business man. If the aeroplane is a boon to the busy man, it has become a necessity to the Prince of Wales.

It is another example of that air-mindedness that has come upon us all that we no longer question the wisdom of Royalty flying. There was a time when public opinion questioned the advisability of Queen Victoria travelling by train to attend certain functions. But to-day the Prince of Wales is representative of all that is finest in our youth, and youth *will fly*, whatever the old and staid folk may say.

Flying has enabled the Prince to fulfil more engagements and attend more functions than was previously the lot of the

Heir to the Throne. There is no man in Britain who works so conscientiously and so regularly for the public weal as the Prince, and the cheer that greets him as he steps out of his Dragon 'plane after it has glided to earth on some aerodrome in Britain is in itself a justification for the Prince to continue his flying progress.

There was a time, not very long ago, when the Prince of Wales was one of the largest owners of private aircraft in the country. His "stable" consisted of a De Havilland Dragon, a De Havilland Fox Moth, and also a Vickers-Viastra air liner. In addition there were two Gipsy Moths.

But this was a transient period. The Prince was seeking the aircraft most suitable for his job—the visiting of cities and functions through Britain. It was also essential that he should have a fast machine combined with the highest possible safety. So the "stable" was reduced, some of the machines sold, and on two types of aeroplanes the Prince eventually decided.

His favourite machine to-day is the De Havilland Dragon. This is the aeroplane used for the numerous comparatively short journeys he has to make in this country, and is capable of landing and taking off on aerodromes not suitable for his larger and more powerful Vickers-Viastra machine, which is the other aeroplane the Prince decided upon.

The favourite De Havilland Dragon has a cruising speed of 108 miles an hour, with a top speed of 130, and has two Gipsy Major engines mounted on the lower wings on either side of the fuselage. They are of the inverted air-cooled type, each of 130 horse-power. Their reliability and efficiency have been proved in several famous long-distance flights, and they are very economical to run.

The two petrol tanks each hold thirty gallons, giving a range of 550 miles in still air. The cabin is just over ten feet long and five feet high. It is decorated in real leather, padded with sound-resisting and fireproof "Kapok", and therefore smoking is permitted. It is well lighted by unsplinterable glass windows.

The Prince's Dragon is a beautifully constructed and handy little biplane, painted in the red and blue colours of the

FORM 414.

ROYAL AIR FORCE.

**PILOT'S FLYING
LOG BOOK.**

Name *H.R.H. Prince of Wales*

Rank *Group Captain R.A.F.*

H. 2071—Wt. 2000—2000 Hrs.—271—W. & S. Ltd. 1920-21

THE COVER OF THE PRINCE'S LOG BOOK

Household Brigade Flying Club. It has become a familiar sight now to the welcoming crowds who gather at local aerodromes to cheer the arrival of the Prince.

This Dragon is wonderfully compact, and the sort of machine that a busy traveller would choose. In the cabin-panelling five different kinds of wood, all grown in the British Empire, are used. Packings of chamois leather and sound-deadening blankets, and insulated windows of double thickness, make the cabin remarkably quiet. At the rear of the cabin there is a compartment storing writing materials, a typewriter, and the Prince's favourite gramophone with a batch of records. There is also an electric heater, a kettle, and a small refrigerator.

Both the Dragon and the other machine, the Viastra, can carry five or six persons, and so members of the Prince's staff can accompany him if necessary in either machine. The Viastra monoplane, however, is more for use on extended travel at home or abroad. The Prince has already used this monoplane on several occasions.

It is an all-metal monoplane, fitted with two Bristol Pegasus engines. The machine is a standard product similar to others which have been used on Australian air routes for some years, but modified in detail for the special purpose of private travel. It was built at the supermarine works of Vickers Aviation, the same factory that built the famous Schneider Trophy racing 'planes. The Bristol Pegasus engine is well known. It holds the altitude record of nearly 44,000 feet, more than eight miles above the earth, and the same type was used for the historic flights recently completed over the Himalayas.

In construction, the machine is entirely of metal, even to the corrugated covering of the wing; it is fitted with slots, and has been designed to fly with full load on either engine, thus securing maximum safety in every respect. An interesting detail of equipment is a powerful electric searchlight built into the left wing. Every modern gadget has been installed. There are electric inertia starters for the 600-horse-power Pegasus engines, wheel brakes, and a wireless set for transmission and reception up to 300 miles. The Viastra, which bears the colours of the Household Brigade, is kept at Hendon, the headquarters of the London Squadrons of the Auxiliary

Air Force, of which the Prince is Honorary Air-Commodore-in-Chief.

The public first saw this twin-engined monoplane when the Prince flew from Hendon to Cardiff in the summer of 1933. It was then noticed that the machine carried parachutes for all passengers. They are in concealed pockets in the roof, and are released by pressing a button.

I emphasize all these details because it is obvious that the Prince of Wales takes no unnecessary risks when flying to and from on duty. As Heir to the Throne, he realizes that he has a special duty in that respect. He is, in all cases, a passenger, and does not attempt to interfere with the judgment of the pilot or the air officials. There has been a good deal of nonsense written about the Prince flying his own machine. Let it be said at once that he is quite capable of flying a machine, but does not. He has one of the finest pilots in Britain to do that.

The pilot is Flight-Lieutenant E. H. Fielden, A.F.C., R.A.F.O. A slim, dark-haired young man with a Guards moustache which he is apt to twirl when asked awkward questions, I found him very reserved about himself and his work. To him, piloting the Prince of Wales is a job, and a job that he does extremely well. But he is no mere safe pilot. I understand that he has done some extraordinarily fine air racing for the King's Cup, and so also did Squadron-Leader Don, whom this young man succeeded.

For the most part Fielden is just calm, and collected, and uncommunicative. When I talked to him about the Prince's many flights in Britain and elsewhere, and begged for details, I was merely supplied with the pilot's flying log-book, which was as sparse of romantic or sensational details as this young man himself. Altogether one received the impression that he was just the man for the flying of the Prince's machines. Like most of the young flying-men of to-day, he confessed that he never smoked.

It is probable that the Prince of Wales took his first flight during those tragic days on the Western Front when our young fliers took great chances against the overwhelming superiority of German numbers.

But it is Imperial Airways that had the honour of taking

the Prince of Wales on his first official air trip. This was on April 4, 1926, from Paris to London. The air liner was the *City of Pretoria*, piloted by Captain Jones. One can recall the newspaper excitement that this particular flight occasioned, although to-day that Channel flight is known to hundreds of thousands of passengers. The flight took two hours thirty-nine minutes, a much longer affair than it is to-day.

Imperial Airways was deservedly proud of this flight. The fact that the Heir to the Throne did not hesitate to use the air liners on the Channel route did much to encourage hitherto hesitant passengers. I recall travelling some months later from Paris in this same *City of Pretoria* and finding a brass plaque nailed at the end of the cabin recording the fact that the Prince of Wales had flown in this machine.

The next time we have a record of the Prince of Wales in the air was the end of a short holiday in the South of France, which he took when the King was recovering from the severe illness that began in November 1928. The Prince's big-game holiday in the heart of Africa had been abandoned when news of the illness of the King reached him, but once the crisis was well over the Prince went for a few days' rest in the South of France.

He returned from Marseilles by air, in a Wapiti, flown by Squadron-Leader Don. Adjusting a parachute, the Prince took his place in the cockpit. Don opened out the engine, and in a few minutes the machine was rushing towards London. I have the log of that flight before me. It was one of the fastest flights accomplished by Don.

From Marseilles to Lyon, the Wapiti took one hour twenty minutes. From there to Le Bourget was covered in two hours thirty-five minutes, and from Le Bourget to Smith's Lawn was accomplished in two hours twenty-five minutes.

These were the first record flights of the Prince. They merely proved to him that as a time-saving method of transport the aeroplane was unequalled. It was natural that his active mind should begin to turn towards the regular use of an aeroplane to help him in his multifarious ceremonial duties up and down the country. He decided to fly.

I find his first official logged flight took place on April 27,

1928. This was in a Service machine, a Bristol Fighter, piloted by Flying-Officer G. C. Stemp. They flew in the afternoon for thirty minutes over Northolt.

It was precisely a month later, on May 27, in the same Bristol Fighter, that Flight-Lieutenant D. S. Don piloted the Prince from Scarborough to Bircham Newton. The flight lasted for one hour thirty-five minutes, and during the course of it they flew over Sandringham. Three days later the Bristol Fighter, with the Prince of Wales as passenger and Don as pilot, flew from Norwich to Northolt after the Prince had visited the Norwich Aero Club meeting. The Flying Prince had really begun his career.

From that moment the Prince began to travel the airways, and in the few years that followed he must have covered some hundreds of thousands of miles through the clouds. He has flown in South America, in the United States, and over some of the worst bush country in Africa. As one begins to flick the pages of that log-book, a film of air adventure, in which the Prince is the central character, materializes.

Flight-Lieutenant Don becomes Squadron-Leader Don. There is a significant entry on June 11, 1929. The Bristol Fighter has now become a Wapiti, and there is the flight of one hour five minutes from Hendon to Cardington to inspect the airship R 101. Two days later the Prince is flying over London at a height of 7500 feet, a droning speck in the sky which the busy millions in the streets beneath were unable to see.

The Prince is climbing the skies, like other young men of his time. He is setting a fine example. On July 23 of that year, still in the Wapiti, he is flying from Burton-on-Trent to Hendon and crosses Daventry at a height of 8600 feet.

On August 9, 1929, the Wapiti has given place to the Prince's first private machine, a De Havilland Moth with the markings G-AAKV. Squadron-Leader Don is still the pilot, and they set off to fly from Hendon to Lympne. It is on this trip that the Prince must have had his first unpleasant bump, for the log-book laconically reports: "Hit a ridge landing."

But this is only the beginning of the Prince's first flying trip across the Channel. Obviously the 'plane was not damaged, for the log-book reports that they went on the same day from



Photo by courtesy]

[Central Pres.

THE PRINCE OF WALES DESCENDS FROM HIS 'PLANE



Photo by courtesy]

[London News Agenc

THE PRIME MINISTER CLIMBS ABOARD TO FLY NORTH

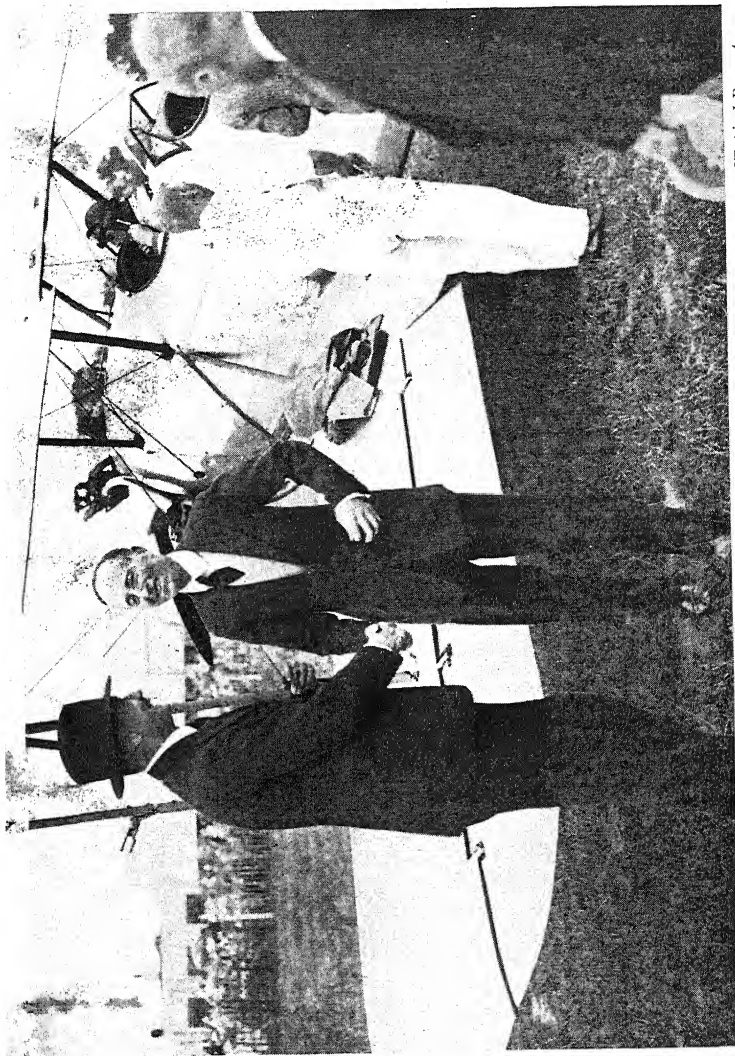


Photo by courtesy]

[Topical Press Agency

THE ROYAL AIR FORCE RESERVE FLYING CLUB OPENING MEETING
AIR CHIEF MARSHAL SIR JOHN SALMOND AND LORD LONDONDERRY

Lympne to Berck, being escorted by a flying-boat from Dover to Gris Nez. These were the days when flying a Moth across the Channel was something of an adventure.

Anyhow, everything went well, for I find it recorded that on August 13 the Moth G-AAKV set out to fly back from Berck to Hendon. The journey took only one hour forty minutes, and the route was via Lympne and Croydon. At the same time the Prince and his pilot found time for an aerial geography lesson regarding the mouth of the Somme. Incidentally they crossed the Channel at a height of 8200 feet.

Ten days later the Moth is flying once again from Hendon to Lympne and from Lympne to Berck. This time the *Logbook* reports that they crossed the Channel above the clouds and then hit the French coast east of Gris Nez. The Prince stayed there a week and then flew back, this time to Brooklands, in the usual time: one hour fifty-five minutes. They were escorted by a flying-boat across the Channel, and made a landing at Hawkinge to change seats.

By this time the Prince is contemplating another Moth machine of later design. Squadron-Leader Don reports on August 30, 1929, that they flew from Hendon to Stag Lane—a mere matter of five minutes—in order to inspect the new Moth at De Havilland's.

But for two days the Wapiti service machine is again in use, for the Prince has to visit and inspect the Schneider Cup team at Hamble. They fly there from Brooklands on September 3 and on the return journey notice an Auto-Giro in the air, and the *S.S. Majestic* below.

The new Moth is soon in use. It is marked G-AALG. It is apparently flown to the Prince, who has gone to Sandringham in the Wapiti and then on to Bircham Newton. On September 5, 1929, the Prince makes his first flight in the new Moth from Bircham Newton to Hendon, the time taken being one hour fifteen minutes; and then, almost every day for the next few days, the Prince is flying locally. One light flight is done from Hendon to Cowes, but for the rest flying is from Hendon to Smith's Lawn and Smith's Lawn to Hendon.

The English winter is setting in, but this does not deter the Flying Prince. The local flights are continued. Squadron-

Leader Don remarking on the weather conditions. One journey is very bumpy, with the wind on the ground at forty miles an hour. On September 22 we have the first stunting in the air recorded on a flight from Smith's Lawn—"Two loops and stalled turns". The Prince is now very definitely air-minded and is accustoming himself to every manœuvre. The next day there are turns, gliding turns, and take-offs with two loops.

And then, alas, the remarks of the laconic Don are no more. The log-book becomes a mere log-book of flights. Yet it is obvious that the Prince is learning, under the careful tuition of his pilot and by dual-control, how to handle the Moth, and he is doing it in the gusty month of October.

On October 6, 1929, Flight-Lieutenant E. H. Fielden appears in the log-book for the first time, piloting the now famous Moth from Smith's Lawn to Gosport. The flight was accomplished in fifty-five minutes, and, needless to say, there are no remarks.

But Squadron-Leader Don reappears and carries on throughout the months of October and November. There is one significant entry on October 17, 1929. It records a flight of fifteen minutes local over Northolt. But this is the first time that the Prince flies his Moth unaided. Local flights continue for a day or two in a Tomtit, and then, on November 29, the Prince flies in the big Fairey monoplane piloted by Squadron-Leader A. G. Jones-Williams over Northolt. This machine was the ill-fated *Silver Torpedo*, which a few days later set out on its non-stop flight to the Cape. Squadron-Leader Jones-Williams, accompanied by Flight-Lieutenant N. H. Jenkins, hurtled in the night into one of those towering peaks that form the Atlas Mountains of North Africa, and the machine that the Prince had admired so much, and seen controlled by a great pilot, crumpled into a worthless heap of scrap metal.

The Prince's log-book for 1929 ends with a flight on Christmas Eve of one hour ten minutes from Hendon to Bircham Newton, with Flight-Lieutenant E. H. Fielden as the pilot. From this date Fielden becomes the regular pilot of the Prince.

The next year, 1930, saw the Prince back again in Africa resuming that holiday in the heart of the big-game country

that had been interrupted a year previously by the King's illness, and it was natural, on his arrival in Africa, that he should choose to utilize the aeroplane to carry him over country which, if not inaccessible, would have taken weary weeks to traverse. I have flown over some of this country myself, and realize that the aeroplane is the only reasonable form of transport.

From Juba in the South Sudan, the Prince flew in a Fairey Service machine piloted by Flight-Lieutenant Bowen-Buscarlet to Mongalla in one hour fifteen minutes. The date was April 4, 1930, and the climatic conditions over those African swamps must have been sticky and uncomfortable. But they continued the flight in the Fairey for another hour to Mongalla, the Prince busying himself en route photographing game. Finally they reached the camp in the wilds, where the Prince settled for several days, using his camera more than the gun.

But the holiday was only a short one, and it was necessary for the Prince to return to England quickly. This he did by again making use of a Fairey machine piloted by Flight-Lieutenant Bowen-Buscarlet. This fast aeroplane did its work well. It flew from Malakal to Kosti in two hours fifty minutes, and from Kosti to Khartoum in another two hours. The Prince remained in Khartoum for three days, and once again the Fairey took to the sky. They flew along the Nile, but avoided the windings of the river and struck across the wild and inhospitable Nubian Desert and managed to reach Assuan that evening. From thence to Cairo, the aerodrome at Heliopolis, was four and a half hours' flight the next day.

Throughout the summer of 1930 in England, Flight-Lieutenant Fielden is piloting the Prince about the country, going from engagement to engagement, for the most part using the Moth marked G-AALG.

But in the summer the machines began to change. Moths and De Havillands of different design appear. The Prince is by now accustoming himself to the various modern types of aeroplanes, and the end of the year finds him flying from Hendon to Calshot in the *Saro Cloud*, with Flight-Lieutenant Scott as the pilot.

It is at Calshot that he finds the famous German giant

flying-boat *Dornier-DOX* moored, with Captain Mertz in command. He is anxious to see the machine in flight. So the giant flying-boat roars down the Solent and takes the air for thirty minutes, and, according to Captain Mertz, the Prince piloted the machine himself for a time.

But the time had come for the Prince of Wales, as Britain's greatest ambassador, once more to travel overseas. On this occasion he was to visit South America, and the whole of that great Latin continent was excited at the prospect. It was natural that the Prince should begin this tour by flying from Hendon to Paris in his latest machine, D.H.80A, marked G-ABBS. Flight-Lieutenant Fielden, who was to accompany him on this South American tour, was again the pilot.

It was on this South American tour that the Prince did a good deal of flying. Although he used the De Havilland machine for most of his flights over Buenos Aires and the surrounding country, he did on occasions use a Fairey III F, piloted by Flight-Lieutenant Down. He must have seen a good deal of the pampas and the wild country that lies towards the Andes while flying through what Paul Morand has described as "Indian air". These South American flights concluded with a landing on the deck of H.M.S. *Eagle* in the Fairey III F, after which they took off again and landed on the aerodrome in Rio harbour.

The South American holiday ended on April 27, 1931. The Prince landed from a liner at Bordeaux, and there the ubiquitous Captain Olley, with the Imperial Airways liner *City of Glasgow*, was waiting for him. They were quickly in the air, and in three hours thirty-nine minutes had reached Paris. The air liner was refuelled and Olley took off again, crossed the Channel, and headed the *City of Glasgow* towards Windsor Park. The machine flew low, and many aeroplanes circled overhead, welcoming home the Prince after another successful journey abroad. Handling the air liner with his usual skill, Olley made a perfect landing, and the Prince was within a few yards of his country house.

Once again the series of local flights, the keeping of public engagements by air, fill the log-book of the Prince. D.H.80A is in almost daily use, piloted by Flight-Lieutenant Fielden.



Photo by]

[W. J. Makin

CHANGING A WHEEL AT TOBRUK

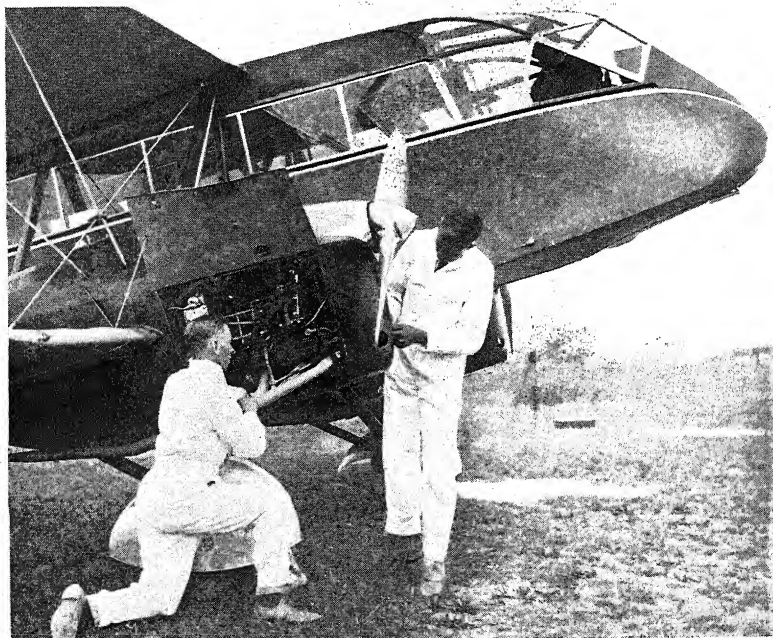


Photo by courtesy]

[“Sphere”

FINAL ADJUSTMENTS TO THE PRINCE'S 'PLANE (DE HAVILLAND DRAGON)

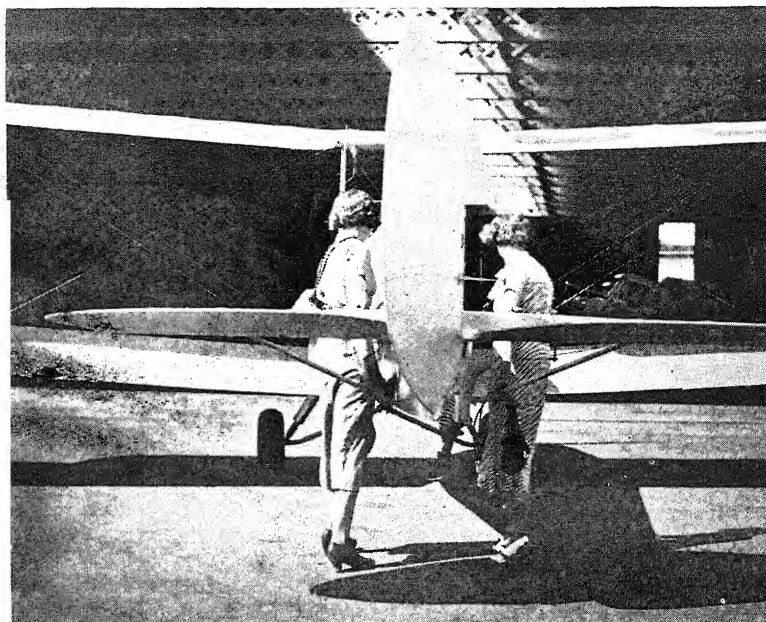


Photo by courtesy]

[Chas. E. Brown

BROOKLANDS AERO CLUB
GIRL PILOTS PUSHING THEIR MACHINE INTO THE HANGAR



Photo by courtesy]

[Chas. E. Brown

BROOKLANDS AERO CLUB
DISCUSSING THE MORNING'S FLYING

In these days Fielden is obviously a very busy man. I suspect there are many occasions when he practically slept in the machine flying constantly between Smith's Lawn in Windsor Park and distant parts of England.

This monotony of engagements is broken only by a flight of thirty-five minutes in a new Imperial Airways flying-boat, the *Sylvanus*, piloted by Major Brackley over Southampton Water. This was on May 27, 1931.

Then G-ABFV is in use, but there comes a time in July when the Prince decides upon a holiday. He is flown by Fielden in a Wessex to Lympne, on August 18, in forty minutes. There he refuels and goes on to Paris. A month later he is flying between Biarritz and Pau, skirting the Pyrenees, and on September 19 he is back again in Paris flying to Hendon.

G-ABRR becomes the favourite machine. I find in the log book that it is flying regularly in the winter months to the many engagements which the Prince attends. Occasionally he bursts away in the air for a holiday. He flies to Aintree to see the Grand National on March 18, 1932. From Smith's Lawn the journey there is accomplished in one hour forty-five minutes. Returning the same day, it is covered in one hour five minutes.

Very soon G-ABRR is in regular use for taking the Prince to play golf. For many days in the summer Flight-Lieutenant Fielden is piloting the Prince to Sandwich, and one can guess that a bag of golf-clubs is stowed away somewhere in the machine. In August 1932 the same machine is flown to Biarritz for a few days' holiday on the coast, and then once again the return is made to the usual engagements in Britain.

The new Dragon Moth G-ACGG, comes into operation. Soon it is a familiar sight on the aerodromes of Britain and to the watching crowds. By this time the Flying Prince is accepted. It is considered normal that he should fly from engagement to engagement. And when he decided to visit Denmark in September 1932 it was natural that he should choose Imperial Airways as the mode of transport to the Continent. The Prince believes in the mission of Imperial Airways and wished to advertise them abroad to the best of his ability.

The Prince of Wales, accompanied by Prince George and suite, left Croydon in the air liner *Heracles* just before ten o'clock on the morning of September 22. They landed for lunch and tea at Amsterdam and Hamburg. In Belgium and Holland the machine encountered winds of nearly gale force, but beyond a delay of a few minutes the passengers were unaffected by the storm.

Tremendous scenes of enthusiasm greeted them on arrival at Kastrup aerodrome, three miles from Copenhagen. Just as the sun was setting, a flight of twenty-seven aeroplanes appeared against the crimson sky. First came the giant air liner *Heracles*, carrying the Prince, with all her lights on. Behind her, in perfect formation, came sixteen machines of the Danish Air Force and eleven other 'planes. As the air liner came to ground she parted from the escort, which circled overhead. The Prince was greeted by the Danish Crown Prince and subsequently driven to the Palace. The pilot of *Heracles* on this occasion was Captain "Jimmy" Youell, who has been with Imperial Airways since the Company was formed eight years ago.

Three weeks later *Heracles* returned to pick up the Prince at Malmö, flew him back to Hamburg, where he spent a night, and the next day to Amsterdam.

In Denmark the Prince experienced flying in Danish naval seaplanes. While in Sweden he flew from Stockholm to Gefle and back in a Junker flying-boat, accompanied by the Crown Prince of Sweden.

It needs to be emphasized how much these flights by the Prince have developed air-mindedness in Britain. They have impressed on municipal and local authorities the importance of having some kind of landing-ground in the neighbourhood of their town.

The Prince emphasized this point when declaring open the Norwich Municipal Aerodrome last summer. There have been occasions when the Prince's decision to arrive by air to carry out an official function has at long last induced the corporation of the place concerned to level a field or cut down a few trees and put up a wind-indicator, thereby providing a fairly adequate landing-ground for future use.

Day by day the Prince of Wales is increasing this air-mindedness among the people of Britain.

III

I wish I had the space within the limits of this book to tell of the immense growth of private flying in Britain, of the enthusiasm of the flying-clubs, of their many activities and the youthful members whom I have met up and down the various aerodromes of the country.

Britain is the natural home of clubs, and every activity brings its devotees together under the umbrella of some form of club, society, or association. It is only, then, to be expected that this latest form of transport, with its ever advancing development, its possibilities for sport and its background of national defence, should follow this accepted rule. And so we find well over fifty of these flying and aero clubs scattered throughout the island, from Glasgow to Southampton, from Liverpool to Lympne.

I would that space permitted to refer to many of these clubs which are doing much to preach and practise the doctrine of air-mindedness. From the point of view of date I believe Lancashire gave the lead; London duly followed, and has carried on the good work intensively. Brooklands, with its connection at Lympne, is a favourite and successful meeting-place. Heston, admirably run, is always associated in my mind with that capable young man Nigel Norman, as is Hanworth with my friend the Master of Sempill. The London Aeroplane Club, an institution second to none, is quartered to-day at Hatfield after a long and happy sojourn at Stag Lane.

Then there are a number of clubs of restricted membership, such as that of the Household Brigade, limited to serving and past officers of the Brigade of Guards and to members of the Ladies' Section of the Guards Club; a display as excellent as it is popular is given by this Club at Heston each year.

A recent addition is the R.A.F. Reserve Flying Club, which my son founded some months ago, and which had a very happy house-warming in July last. This club is limited to men, and

is open primarily to pilots of the Reserve of Air Force Officers, but past and present officers of all the flying services in the country as well as members of the Oxford and Cambridge University Air Squadrons may also be admitted. The minimum flying qualification is in all cases fifty hours.

More than one of the professions—e.g. the Stage and Screen—have discovered in the camaraderie of the air good cause to found a club, and others will doubtless follow. To the great public schools a lead is being given by Air Vice-Marshal Borton, who has been one of the moving spirits in launching the Old Etonian Flying Club. And so one success succeeds another.

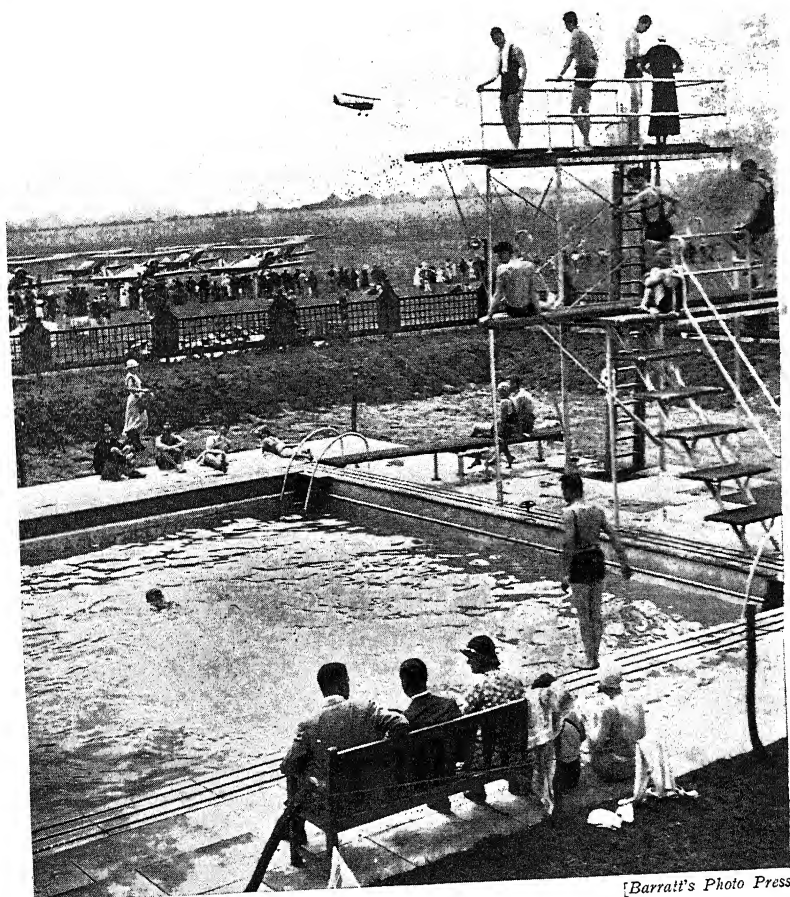
In quite a different category is that excellent institution the Royal Aero Club. A volume could well be written upon its services to British Aviation from the very earliest days, under the guiding hand of that most popular and genial of secretaries—Commander Perrin.

And, lastly, a tribute must be paid to the ubiquitous Automobile Association. For five years its Aviation Department has been in operation, and each year Sir Stenson Cooke and his able assistants work out something new for the comfort and security of British airmen.

But I do think something should be said of a real youth movement in aviation, that of the University Air Squadrons of Oxford and Cambridge. These young men, who spend their week-ends and vacations flying over England, are a source from which the great airmen of the future will be taken.

I do not suppose Lord Hugh Cecil would admit that he was really the founder of the University Air Squadron, but it was certainly an idea from his fertile brain that began the scheme. In 1918, at Salisbury, he suggested to a young squadron commander that the newly fledged Royal Air Force might do well to recruit its officers direct from the universities. This officer was E. L. Howard Williams, who, after the war, went to Oxford to take mathematics, and to Cambridge to read engineering.

In 1921, while at Oxford, Howard Williams suggested to a member of the Air Council the formation of special Air Force units at Oxford and Cambridge. The idea persisted, and while



By courtesy]

[Barratt's Photo Press

THE FIRST MEETING OF THE
ROYAL AIR FORCE RESERVE FLYING CLUB, HATFIELD

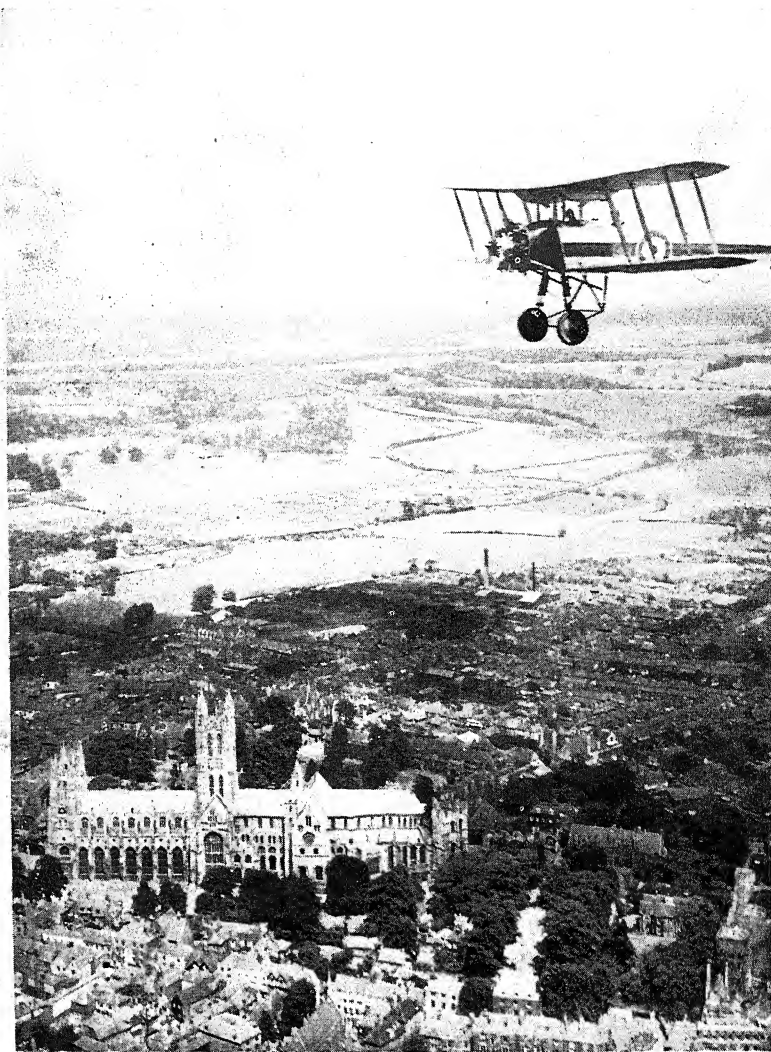


Photo by courtesy]

[Chas. E. Brown

OXFORD AIR SQUADRON (AN AVRO LYNX) OVER CANTERBURY

at Cambridge, in 1924, he was instrumental in obtaining the permission of the University authorities and the approval of Sir Hugh Trenchard, then Chief of the Air Staff.

Cambridge began with the formation of a University Squadron. Oxford quickly followed. It was not long before the University authorities were satisfied that these new organizations were fit to be entrusted with the responsibility of giving flying experience and flying training in term time. In Cambridge term-time flying began in May 1926; in Oxford it began in January 1927. But both squadrons went to their first annual attachment to Air Force stations in June and July 1926. Oxford went to Manston, in Kent, and Cambridge to Old Sarum.

The training life of these squadrons had, and has still, three aspects. Within the University there is practical and theoretical instruction in the maintenance, control, and pilotage of aircraft and in Air Force subjects. At the parent units there is flying training in term time. At the annual attachments at Manston and Old Sarum there is more intensive training, particularly in flying, and also in Air Force subjects.

Members are selected on probation by a committee including representative dons and undergraduates under the chairmanship of the chief instructor. Full membership, originally limited to 25, was increased in successive years to 50 and then 75, at which it still remains. Encouraging results soon began to appear, not only in applications for commissions in the Royal Air Force and the Reserve of Air Force Officers, but also in Air Ministry appointments.

Since 1924 the principal development in flying has, perhaps, been a mental development. In this the University Air Squadron continue to play their part. A steadily mounting number of regular and reserve commissions is, perhaps, in itself sufficient reward for the cost of these organizations. But what is probably far more valuable to the nation is the number of junior and senior members of the Universities who have, by the instrumentality of these Air Squadrons, become positively and dynamically mindful of the air.

My own introduction to these excellent bodies of keen young men came through my old friend and colleague, the late

Sir Geoffrey Butler, who was one of the members for Cambridge University, and on more than one occasion held out to me an invitation to spend a week-end with him at Corpus. As an additional attraction he insinuated that at no College in the University was to be found a better glass of port.

The invitation accepted, I found myself in Butler's rooms with about two hours to go before dinner. He thereupon suggested that we should fill in the time by having a look at the headquarters of the Cambridge Air Squadron, of which I knew my host was one of the most wholehearted supporters.

When we made our little tour Sir Geoffrey turned round and asked me what I thought of the headquarters.

"Very nice indeed," was my reply; "but some of your material does not seem to be very up to date."

He nodded.

"My dear Harry, you are quite right. Now, what we would really like, if you could let us have it, would be one of your Napier-Lion engines."

I laughed heartily at the trap into which I had unwittingly fallen, and, having congratulated Butler on the apparently innocent way in which it had been laid, said that I would do my very best to persuade my colleagues to send a "Lion" along.

We then went back to Corpus, where I had the pleasure of meeting the Professor of Aeronautics, the Professor of Engineering, and other friends of Sir Geoffrey, some quite delightful men, at a very jolly little dinner-party.

My colleagues at Napier very readily agreed to my request, and, in fact, added to the suggestion, and in due course we went up to Cambridge to hand over two "Lion" engines, one of which was so constructed that it could be pulled to pieces and reassembled by the members of the Air Squadron.

A week or two later I happened to join the late Lord Cave at a luncheon table in a Pall Mall club, and, with a humorous twinkle in his eye, he enquired why it was I had been instrumental in presenting Napier-Lion engines to the University of Cambridge. I told him that I was surprised to learn that he knew anything about it, for it had been carried out with all quietude and privacy.

"Never mind," replied Lord Cave, "I did hear, and remember, I am not only Lord Chancellor of England, but Chancellor of the ancient University of Oxford, and you are an old Oxford man."

"Yes," I replied, "that is a hit all right, but it was a Cambridge friend who showed sufficient energy to entice me up to Corpus and prepared a pretty little trap into which I fell, and also," I added (and it was true at that time), "I know nothing about the Oxford Air Squadron."

"No," replied Lord Cave with a cheery laugh, "but you soon will."

And so Oxford got Napier-Lions as well as Cambridge, and I know of no visits I have enjoyed more than as the guest of each of the squadrons on more than one occasion. They are both doing fine work in flying and in research.

In each university it is the very finest material which is being attracted to join these squadrons, the personnel of which, as time runs on, will do much for the science and art of aviation.

CHAPTER XI

INTERNATIONAL BARRIERS

I

It happened at Naples.

We had been flying from Marseilles via Corsica and Rome in a huge, four-engined monoplane belonging to Imperial Airways. We had skirted those deadly mountains, a sort of backbone in Italy, where some days previously that fine and brave air adventurer, Bert Hinkler, had crashed and left the world guessing as to his fate.

Our wireless operator had received news that the usual aerodrome at Naples was not likely to provide a satisfactory landing-ground for our huge monoplane, and it was therefore suggested that we descend at Capua, a military aerodrome some forty-four kilometres from Naples. Towards four o'clock that afternoon we sighted the smoke-strewn cone of Vesuvius and landed easily at Capua.

At once our monoplane was surrounded by Italian Air Force officers and men. They were obviously keenly interested in this giant type of machine, and with a natural curiosity the Italians not only crowded round the machine, but swarmed all over it. They engaged our mechanics in conversation regarding technical details, but, as nobody could be understood in the conflicting English and Italian babble, the thirst for technical details could not be slaked.

While all this was proceeding, the Italian officers courteously invited us into their mess. A very comfortable mess, well furnished, and with the inevitable portraits on the wall of Mussolini and General Balbo, Chief of the Italian Air Service. Cigarettes were produced, an orderly was commanded to bring a tray of liqueurs, and all the courtesies of Italian hospitality were lavished upon us.

We stretched ourselves at ease and talked. Liqueurs were

sipped and cigarettes smoked. A ~~laissez-passer~~ that I carried from the Italian Embassy in London was examined and approved. Our passports were being meticulously scrutinized in another room. Officers had already searched the cabin of the plane for cameras and photographs. Reports had been transmitted as to our route. It was accepted that we had not flown over any of the many prohibited areas in Italy; and that we hoped to leave for Malta at daybreak.

Meanwhile the courtesies continued. They were prolonged. More cigarettes were lit, more liqueurs offered. A considerable amount of money in Italian notes changed hands. This was the landing tax that we had to pay. And when all this had been completed, the officers began another long conversation.

We grew restive. Already it was dusk, and we had been flying from an early hour in the morning. And Naples was still forty-four kilometres away. The thought of dinner at the hotel and an early bed was particularly inviting. I rose and offered the commandant my hand.

"Well, thank you very much for your hospitality. I've enjoyed it. Perhaps you would kindly telephone for a car to take us to Naples. We're all rather tired."

The officer rose hesitantly.

"I am very sorry," he began, "but it is impossible for me to leave—yet."

"But why?" I protested. "Isn't there a car available?"

"Oh yes, there is a car. There are three cars in the village."

"Then I don't understand . . ." I began.

He shrugged his shoulders.

"There are certain formalities," he said, "which are not yet complete."

"But you have seen our passports?"

He nodded. "They are quite in order."

"And you have the log of our journey?"

"That also is in perfect order."

"And you have examined the cabin?"

"That also seems in order."

"Moreover, you have read this letter from your own Embassy in London?"

The commandant bowed.

"I appreciate all that, but I must nevertheless ask you to remain here a little longer," he insisted.

"But how long?"

I was beginning to feel somewhat annoyed.

"For two hours only," said the commandant. "By that time the customs officer who has just left Naples will have arrived here. Please to have another liqueur. . . ."

It was then I began to realize how complex, how absurd, are many of the international regulations regarding the air. The story of that customs officer's journey from Naples to Capua was a little Latin nightmare. He had to change twice *en route*—he was coming by the local railway—and the last part of his journey would probably be done on foot, a matter of two or three miles. But until he had glanced at the monoplane and ourselves, the commandant was determined to keep us as his guests.

It took us ten minutes' hard talking before that commandant allowed us to depart for Naples. Even then, he was obviously loath to let us go. He did so only because I pointed to the obvious fact that he had the monoplane and all our baggage in his possession. And if that was not sufficient bail for our good behaviour, I gave him the address of our hotel in Naples.

It was not sufficient. The assistant pilot, a mechanic, and a wireless operator had to remain. They were to stay until the arrival of the mysterious customs officer. And so, after nearly two hours wasted in the exchange of official courtesies, we motored in the darkness towards Naples. It was not until three hours later that the assistant pilot, the mechanic and wireless operator were permitted to leave the aerodrome. The machine was left for the night.

I give this incident at length because it has a real bearing upon one of the greatest obstacles to the development of aviation—the international difficulties which, instead of being simplified, have become more and more complex. I am not blaming the Italians in any way; under the circumstances they could not have been more courteous. They were merely obeying the code of rules. It is the code that is wrong.

And I did have another excellent liqueur before I left the aerodrome of Capua.

II

It is often said that the aeroplane laughs at frontiers. It can fly from country to country without hindrance. Unlike a train, it cannot be stopped and boarded for investigation. The aeroplane is as free as the element through which it drones its song of power.

In actual practice it is very much the reverse. The aeroplane travelling across Europe is subject to more irritating and powerful regulations than any other form of transport. The conductor on the Orient Express train travelling from Calais to Stambul and crossing a dozen frontiers has an easy task compared with the pilot of a 'plane essaying the same journey by air.

I know only too well why record-breaking flights take so long to prepare. It is not that the pilot is waiting for good weather reports. The weather in Europe is bad at times, but not so consistently bad as to demand weeks of waiting. All that time is occupied by the pilot walking about London from embassy to consulate and from consulate to embassy, obtaining passport visas, signing documents, studying the prohibited flying areas spotting the map of Europe, and arranging for the payment of indemnities should he crash and kill someone other than himself in some obscure part of the Balkans, and also depositing a sum of money to secure his ransom against possible capture by brigands.

He must assure Turkish officials that his flight is a purely private one, and in no way connected with espionage. He must assure other countries that he is not carrying opium or some other strange cargo. One territory insists that he carry a week's provisions and water for a fortnight. Another country insists that his 'plane is not overweighted. He is told to carry a pistol in one country and warned that he will be arrested in another if any arms or ammunition are discovered in his possession. Most countries prohibit the use of cameras from the air. Some will permit the harassed pilot to carry a camera.

but will appropriate all his films. And they all retain the right to shoot him down should they suspect that he is contravening these regulations.

Even the amount of money he carries is subject to scrutiny. He may not take certain money out of certain countries. On the other hand, he must pay cash for petrol and oil purchased on the ground. Some countries still subject the pilot to a tax upon the petrol carried in his tanks. And taxation varies amazingly throughout Europe. In France, Great Britain, Switzerland, and the Netherlands, fuel is already free of duty, or else the duty is refunded. An illogical system still holds in France, however, where the duty on benzol is not refunded.

Such are the complications which the ordinary pilot has to face. They are nothing, however, compared with what the big commercial air lines have to endure. There are critics who argue that the transport of goods by air will never be a payable proposition. It is astonishing that with so many regulations and obstacles to overcome the air transport of goods is actually in operation at all. No ship entering a foreign port is subject to so many hampering rules as an aeroplane that has landed to refuel for the next stage of its journey.

Before enlarging on these difficulties confronting the development of international aviation, it might be worth while considering how this admittedly bad system of air law came into existence. As might be expected, it is really a war legislation. Many of the present regulations were formulated when Europe was at war, and the whole of the system was codified immediately after the war ended, when men were war-minded, and not air-minded. It was, as I have suggested elsewhere, war that really developed the aeroplane. But it is war legislation that is now hampering the development of air transport.

Before the war, discussion of air law was somewhat academic. Air transport was still in its infancy and not to be taken seriously. Some authorities argued for the freedom of the air on the same theoretical basis as the freedom of the seas. It was suggested that all aircraft could land without hindrance, the only regulations being those which each country proposed to adopt for its own safety.

Another school of thought, however, suggested that a state

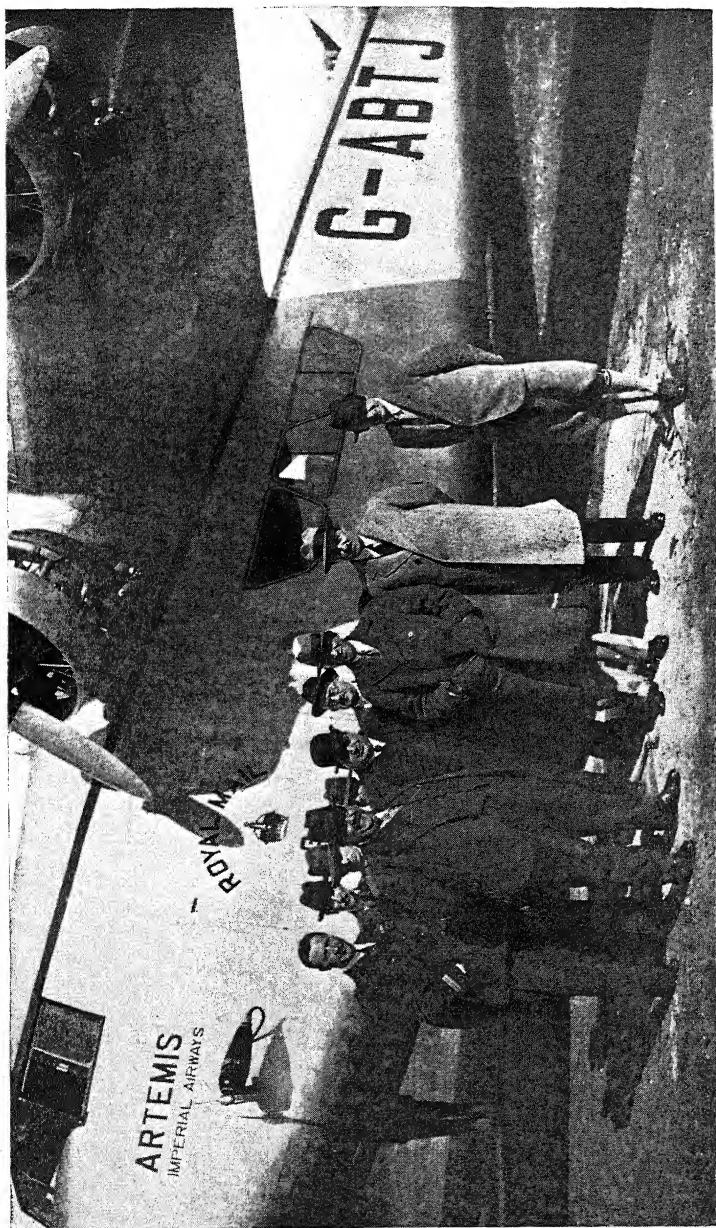


Photo by courtesy]

THE AUTHOR'S WELCOME AT MALTA

Reading from left to right: Capt. Prendergast (Pilot); Mr. W. J. Makin; Sir Augustus Bartolo; Mr. Mifsud Bonnici (Minister of Finance); Mr. Briffa (Private Sec. to the Prime Minister); Sir Harry Brittain; The Prime Minister of Malta; Air-Commodore Rathbone

["Daily Sketch"]



Photo by courtesy]

[“Flight”

TOWARD THE SUNSET
SHORT KENT (BRISTOL) FLYING BOAT OVER THE MEDWAY

had unlimited jurisdiction over its air space, and this school found many adherents in Britain and America. Yet a third school argued that state sovereignty was limited by the granting of innocent passage for aircraft of all nationalities.

Then came the war, and the countries of Europe began to settle their own air laws in a definite hostile fashion. All countries asserted jurisdiction over their air space. Holland, Switzerland, and the Scandinavian states, being neutral, nevertheless repeatedly asserted their right of sovereignty. The Dutch enforced this right by shooting down a German Zeppelin crossing their territory.

And those laws, born during the great conflict, exist to-day. The only modification is that the right of innocent passage has been accepted, in part, by all nations, but only by special treaty. It is these treaties which permit Imperial Airways and others to fly or not to fly over certain territories. But the many laws and prohibitions regarding international flying hang over the frontiers of Europe like those balloon-moored apron screens that hung over London to prevent raiding aeroplanes reaching the city during the war.

It is the International Air Convention of 1919 which is the basis of these laws. The parties to this convention, which begins by affirming the sovereignty of each state over the air above its territory, are the British Empire, Belgium, Bulgaria, Chile, Czechoslovakia, France, Greece, Italy, Japan, Persia, Poland, Portugal, Roumania, the Saar Territory, the Serb-Croat-Slovene State, Siam, and Uruguay. This principle affirmed, the convention goes on to provide for freedom of innocent air passage over the territory of the contracting states for each party to the convention, providing the conditions laid down in it are observed. Such freedom of passage does not apply to prohibited areas which states may desire for military reasons to close to all private aircraft, including those in their own territory; nor does it apply to regular air lines. Special permission for these is required.

The "nationality" of an aircraft is made to depend upon the country in which it is registered. To be registered in a particular state, the aircraft must belong to a national of that state.

or to a company of which the chairman and two-thirds of the directors possess that nationality. Double registration is prohibited. Every aircraft engaged in international navigation must possess a certificate of airworthiness issued or rendered valid by its state of nationality, and the pilot and other members of the crew must be provided with certificates of competency and licences similarly issued or validated. The documents (certificates, licences, log-books, passenger lists, manifests) which aircraft must carry on their voyages are laid down.

Foreign aircraft may be required to land at aerodromes fixed by the state whose territory they enter. Each state has the right to reserve in favour of its national aircraft the carriage of persons and goods for hire between any two points in its territory. Provision is made for the rendering of assistance to aircraft in landing or in distress, for the application to aircraft wrecked at sea of the principles of the maritime law of salvage, for the use of aerodromes at a common tariff of charges, and for certain other matters.

The convention is not applicable to military aircraft nor to state non-military aircraft employed on customs and police service. Postal aircraft are subject to its provisions. A military aircraft is defined as one commanded by a person in military service detailed for the purpose, and such an aircraft may fly over another contracting state's territory only in virtue of a special authorization.

It is necessary to give the gist of this convention, for it is the basis of the international muddle which now characterizes air law. It is obvious from a calm, unbiased study of these laws that for the most part they are based on international jealousies rather than international co-operation. And air-mindedness has gone too far to be hampered by legal-mindedness. Regulations for safety and the like there must be. But let us rid the air of these irritating obstructions.

Air lines now stretch across the world. France goes across Europe, the Mediterranean, Syria, Iraq, India, to Cochin China, and crosses Africa, and eventually South America. The Dutch K.L.M. crosses a multitude of countries in its magnificent journey from Amsterdam to Batavia. The German Luft Hansa, centred in Berlin, crosses frontiers and serves all Central Europe.

Finally, the Italian air lines cross the Mediterranean and link Northern Africa with Europe.

In Britain we are justifiably proud of our own Imperial Airways. The route to the Cape, as well as the route to Australia, is among the longest in the world. For the most part the route to the Cape is over British territory, and consequently fewer hampering regulations are met. And the foreign aircraft that cross India cannot complain of any restrictive legislation.

Let us consider the difficulties confronting Imperial Airways when it wishes to convey passengers from Croydon to the Cape, India, or Australia. The main obstacle of the route is Europe. When Imperial Airways came into being as a state-subsidized concern, it was to find that Europe already had a network of subsidized airways from Constantinople to Calais. Other nations had been busy. The sky over Europe was already claimed.

On the other hand, Imperial Airways intended to develop according to its name, to link up imperially. It was concerned with the lands beyond Europe, the British Empire south and east of Suez. But, unlike the freedom of the sea, there was no real freedom of the sky. Under the Air Convention of 1919 a nation could by means of more than one subtly worded clause prevent any other nation from using its skyway as part of an international long-distance route. In fact, one authority on this subject has pointed out that, "as international air services became established, it appears that their political importance raised misgivings as to the wisdom of complete freedom and led to the provision that their establishment should be subject to the prior authorization of the states flown over."

These "misgivings" were felt particularly by Imperial Airways, which was concerned with across-the-world routes. The difficulties of satisfying national needs and at the same time operating a safe and paying flying route are exemplified in the prolonged negotiations between Imperial Airways and the air authorities of Italy.

As originally planned for the England-India route, mail and passengers left Croydon on a Saturday morning and flew to Bâle, where they arrived in the late afternoon. From there

they travelled in the night train to Genoa, since Italy at that time had not agreed to the aircraft of Imperial Airways entering Italy from France, although the French were using the route which Imperial Airways wished to follow. On Sunday morning the mail and passengers left Genoa in a three-engined flying boat for Rome, Naples, and Corfu. From Corfu the service went via Athens and Crete to Tobruk in Italian Cyrenaica, and from there to Alexandria.

The British agreement with the Italian Government specified that an Italian company should also fly between Genoa and Alexandria, using the same route as Imperial Airways, but in the middle of the week instead of at the week-end. In this way there would be a bi-weekly service between Genoa and Alexandria. After nearly a year's operation, a proposal was put forward for pooling traffic between the two companies, which Imperial Airways could not accept. Owing to this disagreement, Imperial Airways had to give up flying through Italy and change the route hurriedly to one through Central Europe.

The Central European route ran through Vienna, Budapest, and Skoplje to Salonica by land plane. From there flying-boats took the mail and passengers to Athens and Alexandria without touching at Tobruk. It was a satisfactory route during the summer, but the weather conditions were very bad in winter. The mountain area between Skoplje and Salonica is one of the worst in Europe from a flying point of view, and lacks meteorological wireless and night-flying facilities. In consequence, flying had to be confined to daylight hours, and in winter, when these were short, the mail and passengers were sent by a convenient night train over that sector.

After running on this route for eighteen months, a *rapprochement* occurred with Italy. Eventually an agreement was reached in May 1931 whereby Imperial Airways was authorized to revert to the Genoa-Naples-Corfu route for one year only and thereafter to operate with aeroplanes from Milan to Brindisi, and from there across the Mediterranean via Athens by means of flying-boats.

Since the winter weather is better on this route than in Central Europe, Imperial Airways returned to this route in the same month with, however, a certain amount of uneasiness

about another change of route a year later. The proposed new route also produced another cause for uneasiness—namely, that the winter weather round Milan is particularly bad, and that in any case the aeroplane operating the Milan-Brindisi sector would be flying uneconomically and increasing the cost of the service that Imperial Airways offered to the public.

These misgivings led the British experts to investigate all the possible combinations of rail and air services between London and Brindisi, and this investigation showed that in the particular circumstances prevailing some marked advantages would be gained by using the train instead of flying between Milan and Brindisi. Moreover, the expenditure that would otherwise have been incurred in operating aeroplanes between Milan and Brindisi could then be diverted towards the development of the flying-boat service across the Mediterranean.

And so this was decided upon. It means that the passenger flying from Croydon to the Cape or to India or Australia must spend a night in a train between Paris and Brindisi. But once he steps aboard a flying-boat of the Scipio class at Brindisi he will conclude that the Mediterranean service of Imperial Airways is the finest and safest in Europe. At the moment, negotiations are proceeding for the establishment of a flying-boat base at Marseilles. The sanction of the French Government has to be obtained. It might then be possible to fly passengers and mail in Imperial Airways' planes from Croydon to Marseilles, thence by flying-boat to Malta.

And here I would like to discuss the all-importance of Malta in the flying route services that link up the Empire. Malta has already proved itself of immense naval importance to Britain. But its very geographical situation in the middle of the Mediterranean between Europe and Africa makes it an obvious refuelling spot and harbour for flying-boats belonging to the services and to the commercial companies of Europe.

When I recently landed at Malta, after a long flight across the Mediterranean from Naples, I was received by the Prime Minister of Malta, who is an enthusiast for the aerial development of the island. At the moment there is only one land aerodrome. This is used by the Royal Air Force, and particularly by 'planes attached to the Mediterranean Fleet. But

there is also ample accommodation on the coast for sea-planes and Italy is already making valuable use of this.

For the moment, Imperial Airways chooses to use the island of Crete as a half-way house on the Mediterranean flight. Certainly it lies on the direct route from Athens to Alexandria, and the harbour at Mirabella is most admirably suited for the descent of the big Scipio flying-boats. But the use of this base necessitates special agreement with Greece. Perhaps in the near future Malta may achieve her desire and become an important air junction on the route between Europe and Africa.

The intricacies of international air law have also played havoc with the important British air route to India and Australia. They chiefly concern Persia. At the moment, Imperial Airways has abandoned the route along the coast of Persia, and now flies down the Persian Gulf, utilizing such islands as Bahrein, which are under British protection. But it is impossible not to deny that this is inconvenient and expensive.

The history of these air negotiations with Persia is worth recording. It provides plenty of examples showing the interaction of political considerations in air policy.

In October 1926 Imperial Airways had everything arranged for the start of the Cairo-Karachi service, but the service was held up at the Persian frontier for some months. It was understood that Persia, which, incidentally, was a party to the Air Convention, was willing to let Imperial Airways fly along the coast of the Persian Gulf, but it transpired that she was not entirely satisfied. Negotiations dragged on, and at one time broke down altogether. Meanwhile Imperial Airways ran a weekly service between Cairo and Basra.

In 1929 the difficulty was overcome, and the Persian Government granted an authorization to Imperial Airways to fly for three years, once weekly in each direction, along the Persian Coast, subject to certain restrictions. The Persian Government made it clear that they would not extend their authorization to fly along the coast after the expiry of three years, as they had the intention of establishing an aerial corridor through Persia, and if Imperial Airways wished to continue to fly through Persia it would have to do so by using the

corridor. They considered that the period of three years would be ample for the specification of the corridor and for the organization of the Company's ground services along it.

Imperial Airways knew, therefore, that, unless the Persian Government reconsidered their decision before their authorization expired at the end of March 1932, they would have to change their route or stop operating through Persia at all. They therefore applied from time to time to have the corridor specified. In 1931 the corridor was specified, and was as follows: Bagdad-Amara-Ispahan-Yezd-Barn-Gwadar.

This terrain is hardly encouraging for an air route, but, being anxious not to meet troubles half-way, Imperial Airways decided to survey the proposed corridor, both on the ground and from the air. Unfortunately their representative was unable to recommend even that the route be tried; and his report on it made certain what Imperial Airways had feared, namely that it would be a prohibitively costly route for regular all-the-year operation, and particularly impossible in winter.

As a result of that, the British Government applied for an extension of the authorization to use the coast route, and two extensions were granted, the first for two months, and the second for a further four. By that time Imperial Airways had made arrangements for a change-over to a route on the Arabian Coast. This change-over was carried out on October 1, 1932, and Imperial Airways' planes now no longer fly over Persian territory. "I ought to mention," adds Lieut. Colonel H. Burchall, D.S.O., assistant general manager of Imperial Airways, "that during the whole period of operations through Persia neither our personnel nor our service, as such, has given the Persian Government cause for complaint, and it was naturally a disappointment to us to find that the Persian Government were reluctant to allow us to continue to operate along the coast route."

III

It is obvious from the statement of these problems and complexities that simplification of international air laws is

very necessary. The freedom of air transport to the civilized world is absolutely essential. But as matters are at the moment, I am afraid it will be some years before international jealousies and suspicions are overcome.

Nevertheless, considerable work has been done. I have myself constantly brought this subject to the fore, particularly at such gatherings as those of the International Chambers of Commerce and of the British Empire Chambers of Commerce. These bodies, concerned above all with the freedom of trade, have done much to help towards the freedom of the air. Chambers of Commerce in different countries have made representations to their respective governments, with the result that some modification, some cutting away of absurd regulations, have already been effected.

The Civil Aviation section of the London Chamber of Commerce, for example, recently urged upon the Director of Civil Aviation in this country the necessity for modification of certain regulations. They pointed out that one of the most formidable barriers to air traffic to-day is the necessity for obtaining special authorization for an aeroplane to fly over the territory of certain states. Of such states there are in Europe no fewer than twelve, and it frequently takes as long as ten days before the authorization is received. Surely, they argue, aircraft should be accorded treatment similar to that given to surface transport.

There is also the problem of the pilot's passport. It is considered that pilots of air liners on regular routes should not be required to carry a passport with the necessary visas duly attached, but that the pilot's licence should take the place of a passport.

Furthermore, it is considered necessary by Chambers of Commerce that every effort should be made to obtain standard customs procedure for aircraft and their contents in all countries. At present the diversity of regulations is only equalled by the complexity of their requirements.

We are urging that these matters should be simplified by those countries who signed the Air Convention of 1919. In all these problems it is usually found that, whereas some countries are prepared to simplify regulations, others—and generally

the smaller countries—raise objections. The Turkish authorities, for example, insist that at least ten days' notice should be given of intended flights across or to their country, and even then there is no guarantee that the requisite permission will be forthcoming.

But the manner in which these regulations are hampering air transport may be judged from the following instances. A certain European capital, 1100 miles from London, can be reached quicker by express train, which takes 42 hours, than by an aeroplane, which can do the journey in 10 hours flying. To go by air to another capital, 925 miles from London, takes from four to five days at the quickest, while another capital, 1175 miles from London, can only be reached by aeroplane in a fortnight, the delay in each case being caused by the necessity of applying for and receiving authorizations to cross the intervening countries.

In addition to obtaining special authorizations, the governments of several countries require to be notified before a British aircraft passes over their territory. Arrangements for undertaking such flights are further complicated by the fact that the day of arrival and departure at every stopping-place *en route* must be given when applying for a permit. Any subsequent deviations from the route are not permissible unless notification has been given to the governments of the countries concerned. Moreover, to obtain these permits often involves a delay of a fortnight up to six weeks before they are received.

The views of Imperial Airways are that air transport can never hope to meet all calls upon it until "freedom of passage in time of peace" is as world-wide in application to air transport as it is to marine transport. There are two suggested ways of expediting this condition of things, firstly by international ownership of air transport, and secondly by getting the Convention of 1919 still further amended.

The international ownership of air transport seems beyond the dreams even of League of Nations enthusiasts. When a nation increases its commercial aeroplane fleet, warlike suspicions are aroused. But there is a somewhat overestimated value of the commercial aeroplane as a war weapon. On balance, the continuous and powerful potentialities for good of

commercial aircraft far outweigh the minor potentialities for offensive action in time of war. At the same time, there are some people who would see in the internationalization of commercial aircraft a potential air fighting force controlled by the League. This matter is even now being discussed at disarmament conferences.

The only logical development is to impress upon the nations of the world the fact that the freedom of the air is to each one's advantage, that the trade that air travel brings means more money for their exchequers, more facilities for their citizens, less fear of international friction.

The Convention of 1919 should be amended in such a way that states may only refuse permission to the aircraft of other contracting states to fly over their territories on giving reasonable grounds for doing so. Governments will be much less inclined to refuse permission if their reasons for doing so have to be made public. Restrictions other than those necessary for military, police, customs, or quarantine reasons, should also be removed, and the fostering of other objects by means of special taxes extracted from air transport undertakings should be abandoned.

One of the great advantages that air transport has to give civilized countries is that it makes possible the personal touch in a busy world where hitherto the speed of surface transport has not permitted it. Moreover, it acts continuously in times of peace to avoid the development of friction that may lead to quarrels and international strife. The personal touch is still, and always will be, the finest producer of agreement and understanding, however great may be the advance in telephony, telegraphy, and even television.

THE END

Index

- A D.C. engines, 72
 Aerial camera, 237 *et seq.*
 Aerial photography and its many uses, 237-255
 Aerofilms, 252-253
 Aeropostale Company, 46, 95, 170
 African air route, 132 *et seq.*
 Aircraft Operating Company, 245, 248
 Aircraft Transport and Travel, Ltd., 68
 Air France Company, 95, 102
 Air Mail services, 54 *et seq.*; Canada, 107 *et seq.*; Bagdad, 112; Karachi 120; Singapore, 120; Cape Town, 135, 139; South-West Africa, 161-162; Sahara Desert, 171
 Airships, 20 *et seq.*
 Air survey, value of, 237 *et seq.*
 Air Survey Company, Ltd., 245, 248-249
 Akron, 92
 Albert, King of the Belgians, 155-157
 Alcock, Captain Sir John, 68, 80, 136
 Amalthea, 159
 Amanulla, King, 228-229
 American Army Air Corps, 254
 American Nurse, 90
 Amery, Colonel L.M.S., 139
 Andes of South America, adventurous flights over, 171-173
 Andromeda, 159
 Apsley, Lord, 126
 Arabian Desert, disasters over, 178-179
 Arc-en-Ciel, 95
 Arctic Air Route Expedition, 99 *et seq.*
 Arctic Circle transatlantic route, 98
 Arethusa, 159
 Armstrong engines, 72; Mongoose, 159
 Armstrong Whitworth aircraft, 73
 Armstrong Whitworth Aircraft, Ltd., 159
 Artemis, 73, 159
 Astraea, 159
 Atalanta aircraft, 73, 159
 Athena, 159
 Atlantic air route, 79 *et seq.*
 Atlantic Ocean flights, 79 *et seq.*
 Attwood ('Tich'), 46
 Aurora, 159
 Australia, air route to, 121 *et seq.*
 Australian Aerial Medical Service, 207
 Australian desert flights, 174
 Australian Inland Mission, 207
 Austrian Air Transport Company, 50
 Automobile Association, Aviation Department, 270
 Auxiliary Air Force, 259-260
 Avro-Avian aeroplane, 148
 BAGDAD, great air port of Middle East, 116
 Bajac, Captain, 47
 Baker, H., 174-177
 Balbo, General Italo, 87, 89, 93, 98, 274
 Baldonnel Aerodrome, Dublin, 83
 Ballooning, 17 *et seq.*
 Barnard, Captain F. L., 66, 117, 148
 Barrett-Lennard, Colonel, 67
 Batten, Lieutenant Eugene C., 255
 Beaumont, Major K. M., D.S.O., 66
 Bedford, Duchess of, 148
 'B. A. R. C.', Sir George, B.S.Q., 64
 Beil, Gertrude, 116
 Bentley, Lieutenant R. R., 148
 Bertram, F. G. L., 153
 Bertrand, Lloyd, 90
 Bett, Flight-Lieutenant, 143
 Bidon, 5, 168
 Blackburn, Robert, 90
 Bladud, 25-26
 Bleriot, M., 29
 Bleriot & Company, 95
 Bleriot aircraft, 96, 146
 Boardman, Russell, 85, 143
 Bondurat, Captain, 189
 Bonnick, Sydney O., 254
 Booth, Squadron-Leader R. S., 22, 23
 Borton, Air Vice-Marshal, 270
 Bowen-Buscarlet, Flight-Lieutenant, 265

- Brackley, Major H. G., D.S.O., M.C.,
Air Superintendent to Imperial
Airways, 65-67, 73, 111, 267
- Brand, Sir Quintin, 136 *et seq.*
- Breguet aircraft, 94, 208
- Bremen, Atlantic flight of, 83-85
- Brintell, Leigh, 197
- Bristol Aeroplane Company, 20
- Bristol engines, 72, 262; Jupiter, 70,
227; Pegasus, 259
- Bristol Channel flights, 67 *et seq.*
- British Marine Air Navigation Com-
pany, 67
- Broadway, E. A., 192
- Brown, Sir Arthur Whitten, 68
- Brown, Lieutenant, Atlantic flight of,
80, 136
- Bruce, S. M., Australian Prime
Minister, 120
- Bullock, Sir Christopher, 117
- Burchall, Lieutenant-Colonel H.,
D.S.O., 285
- Burney, Commander, 22, 23
- Burnham, Lord, 126
- Buschko, Albert, 214
- Butler, Frank, 178
- Butler, Sir George, 272
- Byrd, Commander R.E., 20
- Cairo-to-Bagdad air route, 111-112
- "Calcutta" flying-boats, 73, 74, 118
- Cambridge University Air Squadron,
270-273
- Canada, aviation in, 104 *et seq.*
- Canadian Airways, 189
- Cape Cod, 85
- Cape-to-Cairo air route, 136 *et seq.*
- Cape Town to London air route, 132
et seq.
- Cargoes, 49 *et seq.*, 182, 190
- Casparyth, Captain R. F., 46, 148,
210-212
- Cave, Lord, 272-273
- Cecil, Lord Hugh, 270
- Chamberlain, C. D., 83
- Christiansen, Captain Friedrich, 86
- Churchill, Rt. Hon. Winston S., 139
- City of Bagdad, 153, 210-212
- City of Delhi, 33, 153
- City of Glasgow, 267
- City of Karachi, 154
- City of Liverpool, 184
- City of New York, 193-194
- City of Pretoria, 261
- Clayton, Sir Robert Alan, 166
- "Clive" troop-carrying aircraft, 227
- Cobham, Sir Alan, 31-32, 147, 252
- Cobham, Lady, 147-148
- Codos, Captain Paul, 47, 146
- Cody, S. F., 30
- Coli, F., 89
- Colin-Jeannel, 173
- Collyer, C. B. D., 193
- Compagnie Messageries Aériennes,
68
- Congo Airways, 161
- Cooke, Sir Stenson, 270
- Coolidge, President Calvin, 213
- Corsin, Captain, 48
- Costes, Captain Dieudonné, 47, 94
- Courtauld, Augustine, 100
- Court-Treath, Major and Mrs., 249
- Cox, Sir Percy, 116
- Coxwell, Henry Tracy, 20
- Cramer ("Shorty"), 101
- Cranwell Aerodrome, Lincolnshire,
141, 142, 143
- Crawford, O. G. S., 244
- Croydon Aerodrome, 35 *et seq.*, 183,
184, 187, 214
- Curtiss Conqueror engines, 86
- Cusmao, Bartholomew de, 25
- D'Aeth, Flight-Lieutenant, 100, 101
- Da Gama, Vasco, 136
- Daily Mail prizes for aviation feats,
68, 80
- Daily Telegraph interviews King
Albert of Belgium, 156
- Daimler Airways, 67
- Damain, John, 26
- Danish Air Force, 268
- Da Vinci, Leonardo, 25
- De Bathe Brandon, Alfred, 130
- De Havilland aircraft, 33, 66, 72, 127,
227, 228, 266; Moths, 100, 148,
149, 161, 202, 209, 258, 259, 262,
263, 265, 267; Hercules, 117
- De Havilland, Captain, 30
- Del Prete, Major Carlo, 94
- Desert Cloud, 149
- Desert flights, 165-181, 216
- Diamond transport by air, 194-196
- Dismore, Captain Fred, 45-46, 73
- Dod, Wolley, 117
- Dominion Air Board, 201
- Don, Squadron-Leader, D. S., 260-
264
- Dormer-DOX, 85-86, 266
- Down, Flight-Lieutenant, 266
- Doyle, Sir Arthur Conan, 33
- Drew, Captain Donald, 46
- Dunlop Rubber Company, 64
- EAGLE Farm Aerodrome, Brisbane,
124
- Earhart, Amelia—see Putnam, Mrs.
- Eastern Air Transport, 97
- Eckener, Herr, 213-214

- Edward, Prince of Wales, 41, 45, 94,
156; aeroplanes and flights of,
257-269
El Beshir, 168-169
- FAIREY aircraft, 140, 143, 146, 165,
249, 264, 265, 266
Far East, R.A.F. flight to, 233-236
Federation de l'Aeronautique Inter-
nationale, 144
Fergusson, Captain V. H., 223
Fielden, Flight-Lieutenant, E. H.,
A.F.C., R.A.F.O., 260, 264-267
Finance of flying, 75-78
Fitzmaurice, Commandant James, 83
Flynn, Rev. John, 207
Fokker aircraft, 47, 52, 122
Foreign Legion deserter, Arabs cap-
ture of, 169-171
Foreign Office, 240
Forest-fire protection by aircraft,
201-203
Franco, Commandante Ramon, 94
- GARLUARK, Chief, 223
Gatey, Harold, 86
Gayford, Squadron-Leader, 85, 140,
141, 142-146, 165
Geddes, Sir Eric Campbell, P.C.,
G.C.B., chairman of Imperial Air-
ways, 62-64, 79, 157, 158-159;
article by, in *Daily Mail*, 77-78
General Air Express, 185
George, Rt. Hon. David Lloyd, 139
Giles, Mr., 178
Glaisher, J., 20
Goddard, Lieutenant George W.,
254-255
Gold, aerial transit of, 183 *et seq.*;
prospecting by aeroplane, 188 *et
seq.*
Gourp, —, 167-168
Graf Zeppelin, 20, 86, 94, 213-214
Grahame-White, Claude, 55
Grayson, Mrs., 90
Great Trans-Pacific Flight, The
(Kingsford-Smith and Ulm), 122
Grieve, Lieutenant Commander, at-
tempts to fly Atlantic, 80-81
Groenhoff, Herr, 30
Grogan, Major Ewart Scott, D.S.O.,
154
Guillamet, Henri, 173
Gutschmidt, Pilot, 47
Gwek Wonding, 222-223
- HALL, H. L., chief engineer of
Imperial Airways, 65
- Hambling Committee, 67
Hambro, Mr., 177-178
Hamilton, Leslie, 89
Hampstead, 187
Handley-Page, Frederick, 30
Handley-Page aircraft, 72
Handley-Page Transport, Ltd., 67,
68
Harper, Harry, 68
Hart, Mrs. Beryl, 90
"Harts" machine, 217
Hawker, Harry, attempts to fly
Atlantic, 80-81
Heliopolis Aerodrome, Cairo, 117, 230
Hemming, H., 244
Henderson, Colonel G. L. P., 66
Hendon R.A.F. Display, 233
Hengest, Handley-Page Silver Wing
aeroplane, 70
Heracles, 268
Hill, James, 90
Himalaya flight by R.A.F., 216-217,
259
Hinaidi Aerodrome, 230
Hinchliffe, Captain, 66, 117
Hinkler, Bert, 93-94, 118, 119, 124,
274
Hinton, Lieutenant Walter, 255
Hispano-Suiza engine, 96
Hoare, Lady Maud, 37, 117
Hoare, Sir Samuel, 37, 117, 125, 140
Hobsonville Aerodrome, New Zea-
land, 130
Household Brigade Flying Club, 259,
269
Howard, Captain, 156
Humphery, G. E. Woods, managing
director of Imperial Airways, 64-
65, 117, 157
Humphrys, Sir Francis, 227-228
Hunefeld, Baron Gunther von, 83
- IMPERIAL Air Survey Association,
244-245
Imperial Airways, 16 *et passim*
Imperial Press Conference, 125 *et seq.*
India, air route from England to,
111 *et seq.*; and Iraq air route, 112
Indian Air Survey and Transport,
Ltd., 250
Indian Trans-Continental Airways,
Ltd., 56, 120
Instone Air Line, 67
Instone, Sir Samuel, 67
"Inter-Empire Air Policy" raised by
author at Imperial Press Confer-
ence, 125 *et seq.*
International Aero Show, 59
International Air Convention of
1919, 279 *et seq.*

- International aviation, intricacies of, 274 *et seq.*
 International Congress of Trans-oceanic Aviators, 103
 Italian Air Force, 274
- JARVIS, Major C. S., Governor of Sinai, 240
 Jenkins, Flight-Lieutenant N. H., 142, 264
 Johnson, Amy—*see* Mollison, Mrs. J. A.
 Jones, Captain O. P. ("Captain Kettle"), 47, 44, 70, 71, 261
 Jones-Willard, Squadron-Leader A. G., 141-142, 264
 Junker aircraft, 50, 66, 83, 162, 187, 268
- KAHLOU, Pilot, 47
 Kastrup Aerodrome, Copenhagen, 268
 Kemp, Major R., 250
 Kidson, Lieutenant-Commander Glen, 148-149
 King's Cup, air racing for, 260
 Kingsford-Smith, Sir C. E., 46, 124-125; Trans-Pacific flight of, 121-124
 Kipling, Rudyard, 32
 Kitchener, Field-Marshal Earl, 63
 K.L.M.—*see* Royal Dutch Air Line
 Koehl, Captain Hermann, 83
 Kronfeld, Robert, 30
- LA BINE, GILBERT, 197-199
 Lasseter, Harty, 174, 177
 Leachman, Lieutenant-Colonel G. E., 231
 Le Bourget, Paris air port, 16, 68, 71, 82, 183, 184, 187, 261
 Levine, C., 83
 Limbach, Pilot, 47
 Lindbergh, Colonel Charles, 33, 81-82, 91, 102, 173
 London Aeroplane Club, 269
 London Chamber of Commerce, Civil Aviation Section, 286
 Lowenstein-Wertheim, Princess, 89-90
 Luft-Hansa machines, 47, 80, 214
 Lyon, H., 122
- MACKAY, ELSIE, 66
 Mackworth, Flight-Lieutenant, 140
 McLaren, Captain, 90
- Maffey, Sir John, Governor-General of Sudan, 156
 Mary, 81
 Mattern, James, 86
 McDermid, John, 209
 McMurray Air Base, 205
 Mears, J. H., 193
 Medical assistance by aeroplane, 203-210, 216, 230
 Mermoz, Jean, 95, 172-173
 Middle East, Imperial Airways work in, 113 *et seq.*
 Minchin, Lieutenant-Colonel, 89
 Mollison, J. A., 79, 93, 118, 149, 163, 166
 Mollison, Mrs. J. A., 68, 149-150, 163, 166
 Montague, —, 22, 23
 Moore-Brabazon, J. T. C., 30
 Morand, Paul, 172
 Murdoch, Lieutenant Patrick, 148
 Mussolini, Benito, 274
- NAPIER engines, 72, 94, 140, 143, 165; Lion, 230, 233, 272-273
 Newcomer, Edna, 90
 New Zealand, aviation in, 130-131
 Nicholletts, Flight-Lieutenant, 85, 140, 142-145, 165
 Norman, Nigel, 269
 Northcliffe, Viscount, 68
 Northern Rhodesian Government Economic Survey Unit, 248
 Norwich Municipal Aerodrome, 268
 Nungesser, M., 89
- Old Etonian Flying Club, 270
 Old Glory, 90
 Oliver of Malmesbury, 26
 Olley, Captain Gordon, 42, 43, 156, 266
 Ontario Forestry Branch, 201, 202
 Ordnance Survey Department, 244
 Outspan, *The*, Major Grogan's article in, 154
 Oxford University Air Squadron, 270-271, 273
- PACIFIC OCEAN, flight across, 121 *et seq.*
 Pacquette, Oliver, 101
 Palestine to Bagdad, desert air route, 224
 Pan-American Airways, 97 *et seq.*
 Payne, Mr., 90
 Perrin, Commander, 270
 Perry, Captain Herbert, 44

- Persian Art Exhibition, air transit of treasures for, 196
 Picard, Professor, 15 *et seq.*
 Pitchblende discovery on shores of Great Bear Lake, 198-200
 Pittendrugh, Captain, 177-178
 Pochon, Dr., 200
 Polando, John, 85, 143
 Post, Wiley, 86, 92
 Prendergast, Captain, 46
 Prospecting from the air, 186 *et seq.*, 247
 Pulford, Wing-Commander, O.B.E., A.F.C., 140-141
 Putnam, Mrs. (Amelia Earhart), 85
- R 36, 21
 R 100, 20 *et seq.*
 R 101, 20, 262
 Radium—*see* pitchblende
 Reder, Joseph, 211-212
 Reid, Pat, 194
 Rhodes, Cecil, 132, 133, 154
 Richardson, Commander H. C., 103
 Robertson, Pilot, 66
 Roe, Sir Alliot, 29, 30
 Rogers, Captain Bill, 42, 44
 Rolls, Charles S., 17-18
 Rolls-Royce engines, 72, 217
Romance of a Modern Airway (Harper), 68
 Roos, Lieutenant, 242-243
 Roosevelt Flying Field, 82
 Rossi, Maurice, 146
 Royal Aero Club, 18, 30, 270
 Royal Aircraft Factory, 65
 Royal Air Force, 46, 56, 65, 68, 111 *et seq.*, 136 *et seq.*, 156 *et seq.*, 165 *et seq.*, 208 *et seq.*, 270, 271, 283; pioneer work of, 215-216, 224; punitive expeditions by, 217-224, 231-232; rescue work of, 179, 224, 232; evacuation work by, 225-229; aircraft as troop-carriers, 227, 229-230; Hendon Display, 233; flight to Far East, 233-236; air survey by, 237 *et seq.*
 Royal Air Force Reserve Flying Club, 269
 Royal Australian Air Force, 129, 242
 Royal Canadian Air Force, 105
 Royal Dutch Air Line (K.L.M.), 46, 54, 280
 Royal Dutch East Indian Airways, 120
 Royal Flying Corps, 64
 Russian Air Force, 46
- SABENA Air Line, 161
 Sahara Desert, adventures on flights over, 165-171
- St. Andrew's Ambulance Association, 209
 St. Paul, E. C., 197-198
 Salaman, Peggy, 149
 Samson, Air Commodore C. R., C.M.G., D.S.O., A.F.C., 141
 Santos-Dumont, Alberto, 20
Saro Cloud, 265
 Sassoon, Sir Philip, 111, 116, 216, 218, 222, 229
 Savoia Marchetti flying-boats, 86
 Schiller, Duke, 194
 Schneider Trophy racing 'planes, 259
 School of Photography at Farnham, 238-239
 Schreiber, Arthur, 213
 Science Museum, South Kensington, 26
 "Scipio" flying-boats, 73, 118, 283, 284
 Scott, Flight-Lieutenant, 22, 118, 263
 Scott-Paine, Hubert, 67
 Searle, Colonel Frank, 67
 Sempill, Master of, 30, 269
 Shaw, Lieutenant H., 68, 69
 Sillevs, Pilot, 47
 Silver, discovery of, on shores of Great Bear Lake, 198
Silver Queen, 137 *et seq.*
Silver Queen II, 138
Silver Torpedo, 141 *et seq.*, 264
 Simmie, J., 128
 Simmie, Miss, 128, 129
Singapore, 147
 Smirnoff, Pilot, 46
 Smith, Lowell, 98-99
 Smuts, General J. C., 139
 Sockburn Aerodrome, New Zealand, 130
 Sopwith, T. O. M., 30
 Sopwith aircraft, 80
Southern Cross, 121 *et seq.*
 South-West African Airways, Ltd 161
Spirit of St. Louis, *The*, 82
 State, Herbert, 213
 Stefansson, Dr. Viljalmur, 99, 101, 102
 Stemp, Flying-Officer, G. C., 262
 Stevens, Captain A. W., 247, 254-255
 Stewart, Dr., 209
 Store, Gordon, 149
 Stowaways, aerial, 210-214
 Stradbroke, Lord, 126
 Stuckey, N. S., 174-177
 Sudan, regulations enforced on flights across, 179-181
 Supermarine-Napier flying-boats 233

- Suring, —, 20
 Swinburne, Flight-Commander, 126
 Sykes, Major-General Sir F. H., 139
Sylvanus, 267
- TAYLOR, MR., 177
 Tempelhof Aerodrome, Berlin, 36,
 214
 Terhune, Clarence, 213
Third Route, The (Sassoon), 218
 Thomas, Bertram, 225-226
Times, 140
 Tomtit aeroplane, 264
Trade Wind, 90
 Transcontinental Air Company, 185
 Travers, Captain Dudley, 44-45
 Trenchard, Sir Hugh, 271
- ULM, CHARLES T. P., 52; flight of,
 from San Francisco to Brisbane,
 121-124
 Union Airways, 163, 224
 United States Air Force, 247
 United States Aviation Service, 233
 Uwins, Captain Cyril, 20
- VAN RYNEVELD, SIR PIERRE, D.S.O.,
 M.C., 136 *et seq.*
 Vandyk, Pilot, 46
 Vaulx, Count de la, 173
 Verne, Jules, 16
 Vickers, Dr. Alan, 207
 Vickers aircraft: Vulcan, 72; Vimy-
 Rolls, 80; Vimy, 137; Victoria,
 181, 227 *et seq.*; Vistra, 258, 259
 Vickers Aviation, Ltd., 259
 Victoria, Queen, 257
Vivienne, 18, 19
Vol de Nuit (Saint-Exupéry), 171-
 172
- Voortrekker*, 138
 Vyvyan, Air Vice-Marshal Sir Vyell,
 K.C.B., D.S.O., 153
- WAKEFIELD, LORD, 150
 Walters, Captain L. A., 44
 Wapiti aircraft, 261-263
Waratah, 242-243
War Birds (Springs), 130
 Warner, J., 122
 Watkins, G. H., 79
 Webb-Bowen, Air Field-Marshal,
 C.B., C.M.G., 141
 Wegener, Professor Alfred, 99
 Western Air Company, 185
 Western Canada Airways, 191, 197,
 199, 206
Westfalen, floating aerodrome, 96
 Wheeler, Sam, 45
 Whelan, Patrick, 174-177
 Wigram, Sir Henry, 130
 Wilcockson, Captain A. S. ("Wilky"),
 42, 43
 Wilkins, Sir Hubert, 122
 Williams, E. L. Howard, 270
 Williams, Wing-Commander, 129
 Williamson Pistol Camera, 253
 Wills, F. L., 253
 Wilson, Flying-Officer B. E., 127
 Wilson Airways, 161
 Woolley, Leonard, 117
 Wright, Orville, 26-27
 Wright, Wilbur, 26 *et seq.*
 Wright "Whirlwind" engine, 82, 122
- Yellow Bird*, 213
 Youell, Captain ("Jimmy"), 45, 268
- ZAPATA, PHILIP, 96
 Zeppelins—see airships

AIDE-de-CAMP'S LIBRARY

Accn. No. 594

1. Books may be retained for a period not exceeding fifteen days.